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1993 COMMAND HISTORY

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Compiled by

R. E. Gadolin and K. S. Mayer

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DTIC COMMAND HISTORY

Naval Aerospace Medical Research Laboratory
51 Hovey Road
Pensacola, Florida 32508-1046

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Reviewed and approved 1 Apr 94

A. J. Mateczun
A. J. MATECZUN, CAPT, MC USN
Commanding Officer



This command history is a compilation of significant information concerning activities of the Naval Aerospace Medical Research Laboratory in calendar year 1992, as directed by the Chief of Naval Operations Instruction 5750.12D. It is used to recruit personnel and provide sponsors and consumers with information about the Laboratory. This publication is printed in accordance with Secretary of the Navy Instruction 5600.20 and Navy Publications and Printing Regulations, NAVSO P-35. It is approved for unlimited distribution by the commanding officer. Trade names of materials and/or products of commercial or nongovernment organizations are cited as needed for precision. These citations do not constitute official endorsement or approval of the use of such commercial materials and/or products.

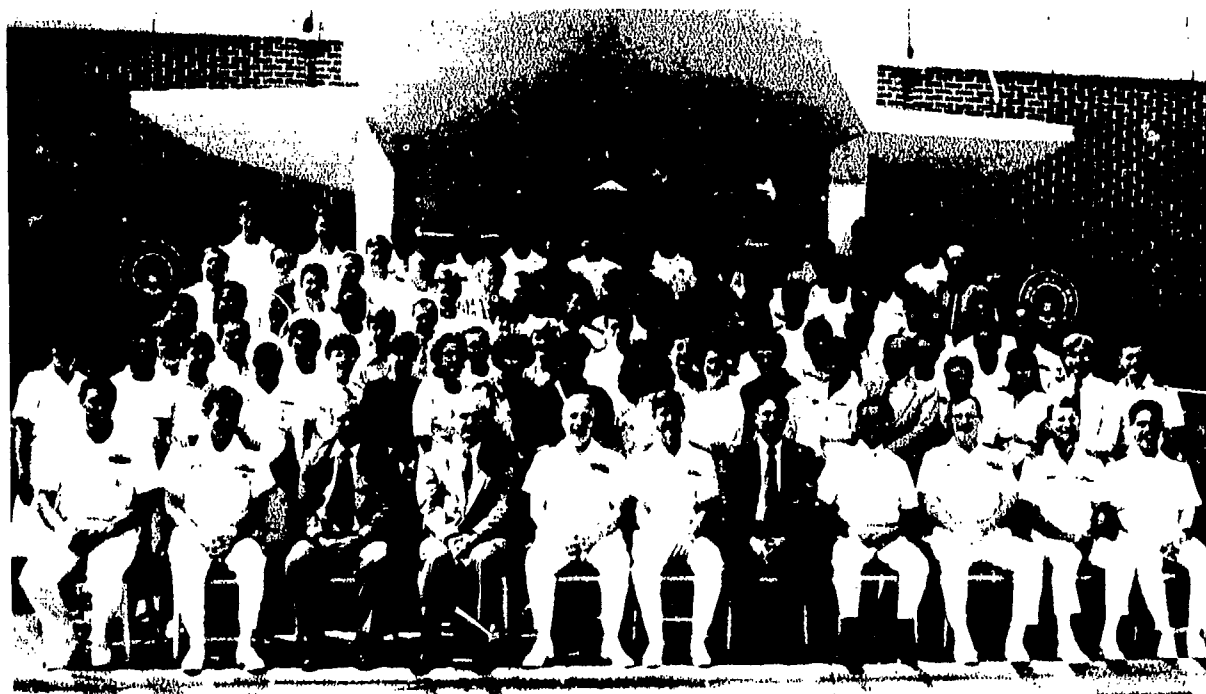
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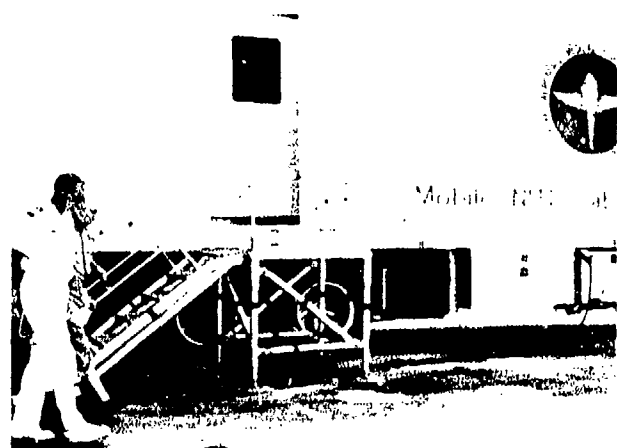
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INTRODUCTION

HISTORY

The Laboratory dates back to 1939 when research in aviation medicine was a function of the Medical Department of the Naval Air Station, Pensacola, Florida. In 1946, research became a department in the Naval School of Aviation Medicine under an officer in charge. In 1951, the School was designated a separate command with a commanding officer. The School and the Naval Hospital at Pensacola later became component commands of the Naval Aerospace Medical Center, which was established in 1957. In 1965, the School was renamed the Naval Aerospace Medical Institute to reflect expanded workload and functions. To facilitate research funding, the Naval Aerospace Medical Research Laboratory was established January 19, 1970, as a component command of the Institute under an officer-in-charge. In 1974, the Laboratory was designated a separate command with a commanding officer, under the direction of the Naval Medical Research and Development Command (NMRDC), located in Bethesda, Maryland.

A.J. Mateczun, CAPT MC USN, Commanding Officer Aug 91-

J.A. Brady, CAPT MSC USN, Commanding Officer Jun 88-Aug 91

J.O. Houghton, CAPT MC USN, Commanding Officer Jun 85-Jun 88

W.M. Houk, CAPT MC USN, Commanding Officer May 80-Jun 85

R.E. Mitchell, CAPT MC USN, Commanding Officer Aug 75-May 80

N.W. Allebach, CAPT MC USN, Commanding Officer Jul 74-Aug 75; Officer-in-Charge Jan 70-Jul 74

VISION

The laboratory that proactively improves biomedical performance of aircrews.

MISSION

The mission of the Laboratory is to conduct research, development, test, and evaluation in aviation medicine and the allied sciences to enhance the health, safety, and readiness of Navy and Marine Corps personnel in the effective performance of peacetime and contingency missions, and to perform such other functions or tasks as may be required by higher authority.

GUIDING PRINCIPLES

Responsiveness
Continuous improvement in all areas
Staff responsible for their performance
Cooperation and teamwork
Equal opportunity

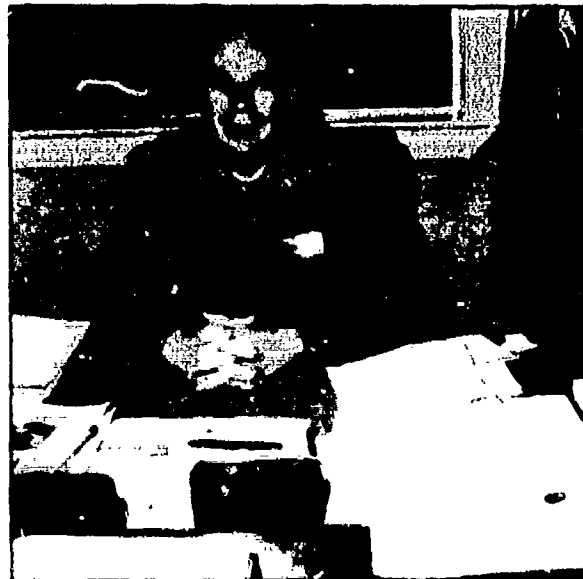
OFFICE OF THE COMMANDING OFFICER

Thrust: Excellence in Research Supporting the Fleet

Commanding Officer:

Alfred J. Mateczun, CAPT MC USN
M.D., University of New Mexico School of Medicine,
Albuquerque, NM, 1978, ophthalmology

Captain Mateczun received a bachelor of science degree in engineering science from the Air Force Academy in Colorado Springs in 1964. He then entered the Air Force and completed the following assignments: undergraduate pilot training (earning his pilot rating), Vance Air Force Base, Oklahoma, (1964-1965); Reconnaissance School at Shaw Air Force Base, South Carolina (RF-4C) (1965); Pilot Systems Operator, RF-4C, Toul-Rosiers Air Base, France (1966); Pilot, RF-4C, Mountain Home Air Force Base, Idaho (1966-1967); Pilot, RF-4C, Tan Son Nhut Air Base, Vietnam (1967-1968), (200 combat missions RF-4C), F-111 Instructor Pilot, Nellis Air Force Base, Nevada (1968-1973). In 1973, Captain Mateczun resigned from the Air Force. While attending the University of New Mexico School of Medicine in Albuquerque, Captain Mateczun entered the U.S. Navy through the Senior Medical Student Program in 1977. In 1978, he earned the doctor of medicine degree and began active duty in the U.S. Navy. Captain Mateczun then reported to the Naval Regional Medical Center, Oakland, California, for his internship. Completing his residency in ophthalmology in 1982, Captain Mateczun was assigned as Staff Ophthalmologist and Head, Ophthalmology Department, Naval Hospital Bremerton, Washington, 1982-1984. His next tour was at the Naval Hospital Naples, Italy, as Head, Ophthalmology Department, Director Surgical Services, and Medical Director, 1985-1988. In September 1988, Captain Mateczun reported as the executive officer of the Naval Aerospace Medical Research Laboratory, Pensacola, Florida. He assumed command of the Naval Aerospace Medical Research Laboratory on 9 August 1991.



Captain Mateczun's decorations include the Distinguished Flying Cross, the Air Medal with 12 Oak Leaf Clusters, the National Defense Service Medal, the Air Force Outstanding Unit Award with one Oak Leaf Cluster and Bronze "V" Device, a Navy Unit Commendation, a Navy Meritorious Unit Commendation, the Navy and Marine Corps Overseas Service Ribbon with two Bronze Stars, and a Republic of Vietnam Campaign Ribbon with three Bronze Battle Stars.

Staff

(Code GOA) **Jerry C. Patee**, CAPT MSC USN, Executive Officer
(Code OOS) **Janelle S. Key**, Secretary (Stenography)

Special Assistants

(Code OOC) **Roger A. Rich**, HMCSAW USN, Senior Enlisted Advisor
(Code OOD) **Sheila C. Hecht**, LT MSC USNR, Safety Manager
(Code OOE1) **D. Melba Antone**, Equal Employment Opportunity

(Code OOE2) Dave L. Still, CDR MSC USN, Equal Opportunity¹
(Code OOF) Mike H. Mittelman, CDR MSC USN, Public Affairs Officer¹
(Code OOG) James C. Baker, CAPT MC USN, Special Assistant for Operational Matters¹
(Code OOG1) Bill R. O'Neil, Maj USMC, Assistant to CAPT Baker
(Code OOI) Pau! Peeler, Command Evaluation Officer²
(Code OOL) G. Chip Glass, LCDR JAGC USN, Legal Advisor²
(Code OOM) Don "E" Hackett, LT MSC USN, Comptroller¹
(Code OOQ) James C. Baker, CAPT MC USN, Quality Assurance Coordinator¹
(Code OOV) Billy W. Howard, MAJ USA VC, Veterinary Advisor²

SIGNIFICANT ACCOMPLISHMENTS

For over five decades, this laboratory has responded to fleet needs. A few examples of our most recent success stories follow.

Competing with over 600 proposals, the Acceleration Division won an ADVANCED TECHNOLOGY DEMONSTRATION (ATD) to combat spatial disorientation (SD). Spatial disorientation is a major factor in aircraft accidents that occurs when pilots incorrectly perceive the attitude, altitude, or motion of their aircraft. Awarded by the Office of Naval Research, the ATD will permit us to examine and ultimately develop prototype flight equipment that can literally save hundreds of lives in the future. One prototype is based on the concept that aircrew can maintain spatial orientation continuously with a torso harness containing miniature vibrators (Fig. 1).



Fig 1. Vibrotactile suit.

During OPERATION DESERT STORM, we provided work schedules for deployed aircrews participating in continuous operations. We also developed an electrolyte replacement protocol and an operational cooling vest so that aircrews could function effectively under extreme temperature conditions. Additionally, laboratory scientists produced and expediently fielded laser threat charts to operational commanders. All of these efforts resulted in specific products delivered promptly to the fleet and proved invaluable to operational commanders in theater.

The Sensory Sciences Division generated aided and unaided NIGHT VISION TRAINING KITS, which are currently being used by Navy, Marine Corps, Air Force, and Army aviation and ground forces to study the idiosyncrasies of both aided and unaided night vision. Night vision device testing instrumentation and standards will be utilized by operational units. Night vision device visual performance specifications will be incorporated in MILSPECS for current and future generations of electro-optical devices.

Elements of the auditory standards test battery will be transferred to the Naval Aerospace and Operational Medical Institute for auditory fitness evaluations of aviators by flight surgeons. The NEW AUDITORY EARCAP will be utilized in advanced hearing protective equipment for aircrew and squadron personnel exposed to high-level noise as well as similarly exposed crew members on surface ships, submarines, and landing craft air cushions.

The Aviation Selection Division developed an operational LANDING CRAFT AIR CUSHION (LCAC) operator selection system, called the LCAC Crew Selection System (LCSS), and transferred to NAMI in October 1992 for fleet use. Recent data show that 96.15% of all recommended candidates were successful in Phase I training as compared to only 60-65% for the preceding years.

Sponsored by the Naval Air Systems Command, NAMRL is participating in the AIRCREW MODIFIED EQUIPMENT FOR LADIES IN AVIATION (AMELIA) project. The goal of this program is to evaluate accommodation of female aircrew in protective flight equipment and clothing. Our task was to develop and

administer a fleetwide survey of all females and a sample of "hard-to-fit" male aircrew (pilot, NFO, and enlisted). Completed surveys for over 60% of female aircrew currently on active duty have been analyzed. Recommendations will be forthcoming concerning flight equipment priority fixes and female urine collection aboard all naval aircraft.

Opening aircraft communities to a wider segment of the population has raised questions concerning the capability to safely conduct flight duties. Moreover, the validity of using current physical fitness assessments as screening tests for naval aviation has been questioned. Tasked by BUPERS, the Aviation Performance Division recently submitted a proposal to identify strength/endurance requirements, to develop a screening test to ensure candidates meet standards, and to formulate a strength enhancement program that will allow all candidates the opportunity to improve strength deficiencies.

Another exciting product is a radiofrequency rewarming vest and warming gloves and socks. Coils of wires encased in a rubberized material provide quick and safe rewarming of individuals exposed to extreme cold. For example, the warming gloves and socks allow deep-sea divers to function comfortably in the temperature extremes of the undersea environment. Cooperative work with NASA to develop this new technology will assist astronauts in working in the extremely cold environment of outer space. Civilian applications of this new technology include use by rescue squads, sport diving, and winter outdoor recreation enthusiasts. Several businesses are interested in licensing these patented products for future manufacture.

COMMANDING OFFICER'S COMMENTS

When I write this, I realize that this will be my last command history at the Naval Aerospace Medical Research Laboratory. Since my arrival as executive officer in September of 1988, I have had many opportunities to work with a truly fine, talented, and dedicated staff. In fact, one often hears this statement about the Laboratory, "Whether it was the School, the Institute, or the Laboratory, it was always the people; the people made the difference." After two tours at NAMRL, I have noted the wondrous spirit of mutual respect and teamwork of the staff on numerous occasions.

While commanding officers may come and go, this institution has been around since 1939. Pioneering research in vestibular physiology, the "Thousand Aviator Study," and a significant role in early space flight earned this command a reputation as a premier research facility. Later contributions of computerized test batteries, motion-sickness desensitization, and radiofrequency dosimetry provided valuable products to support fleet operations, aircrew selection, mission effectiveness, and aircraft design. Today, we offer state-of-the-art products such as rewarming vest and warming gloves and socks, digital enhancement of night vision goggle imagery, improved selection tests, specialized visors for those working night duty, a vibrotactile vest to reduce aircraft accidents, an innovative sound-proofing material and a more efficient earcup, to name a few.

No doubt, the future will bring the Laboratory new scientific challenges and thereby, exciting technologies, methodologies, and services. Based on its past record, NAMRL will most likely be on the cutting edge--developing and marketing innovative products in support of our national security and the men and women in uniform defending our country. What more can we ask?



EXECUTIVE OFFICER

Thrust: Technology Transfer and Internal Review

Executive Officer: **Jerry C. Patee**, CAPT MSC USN
M.S., University of West Florida, Pensacola, FL, 1981,
exercise physiology
M.A., University of Southern California, Los Angeles,
CA, 1973, systems management

Captain Jerry C. Patee joined the Navy as an Aviation Officer Candidate, Pensacola, Florida, in 1968 and was designated as aerospace physiologist #48 in 1969. CAPT Patee was assigned as the first Aeromedical Safety Officer (AMSO) 3rd Marine Air Wing, MCAS El Toro, California, in 1976 and served as AMSO to several squadrons and commands thereafter. He served as Head, APTD, NAS Miramar, California, with additional duty to Commander, Naval Air Forces Pacific January 1984 to March 1988. From March 1988 to August 1991, CAPT Patee was Specialty Advisor for Aerospace Physiology with additional duty to Chief of Naval Operations as Program Manager for Naval Aviation Physiology and Water Survival Training Programs while assigned to the Bureau of Medicine and Surgery, Washington, DC. Captain Patee was awarded two meritorious Service Medals, the Navy Achievement Medal, the National Defense Medal, the Navy Fleet Marine Corps Ribbon, and the Pistol Shot Ribbon with Sharpshooter Device. He reported to the Naval Aerospace Medical Research Laboratory as the executive officer on 25 July 1991.



Staff:

(Code OOA1) **Kathleen S. Mayer**, M.S., Technical Editor (Biology/Medical Science)

(Code OOA2) **Rachel E. Gordin**, Program Analyst

AIMS AND OBJECTIVES

The primary function of the executive officer is to assist and advise the commanding officer on all matters pertaining to the mission of the command. All orders issued by the executive officer shall be regarded as proceeding from the commanding officer. Likewise, all official communications intended for the commanding officer shall be transmitted through the executive officer. The executive officer is additionally responsible for the administrative management of the Office of the Commanding Officer and the development of the Laboratory 5-year Plan and work-unit summaries. He conducts periodic internal reviews of management procedures and research programs and monitors progress of research goals. He chairs numerous Laboratory committees: protection of human subjects, animal care and use, safety policy, awards, Ashton Graybiel lectures, command assessment, equipment survey, facility planning, information systems policy, physical security, position management, scientific personnel classification, and space utilization, and serves on other boards and committees.

The technical editor exercises overall responsibility for report publication within the command; provides editing and writing expertise in the production of all scientific and technical information emanating from the Laboratory; develops editorial standards for the command; coordinates and facilitates the publication of all technical documents; serves as command printing liaison; designs and produces literature and presentations for

special events/projects; assists the technology transfer program director and the public affairs officer; compiles the command bibliography; and manages the technical report archives and distribution.

The program analyst advises the executive officer on accomplishment of his review and oversight responsibilities; collaborates with and provides guidance to research staff in the preparation of incremental and annual reporting requirements; coordinates and facilitates the preparation of work-unit information summaries and proposals; Professional Affairs Coordinator for credentialing; generates the command history; coordinates the Ashton Graybiel Lecture series; compiles reports of special events; assists the technology transfer program director and the public affairs officer; and conducts special projects and studies.

SIGNIFICANT ACCOMPLISHMENTS

Membership in technology transfer networks is an ideal and cost-effective means of organizing and sharing resources. This command is a member of the Federal Laboratory Consortium (FLC) and a founding member of the Gulf Coast Alliance for Technology Transfer (GCATT). The GCATT, composed of 11 federal laboratories, 4 state universities, and a consortium of colleges located in northwest Florida and southern Alabama, was recently recognized by the advanced research projects agency and received a \$450,000 technology transfer program grant. The primary goal of GCATT is to facilitate technology transfer in the northwest Florida region. Successful partnerships between laboratories, the GCATT, and the FLC help transfer technology to industry, academic institutions, and ultimately, the U.S. Economy.

In addition to increased networking activities, we established three Cooperative Research and Development Agreements (CRDAs) with private industry:

1. Major airline; to exploit expertise in aviation selection test batteries.
2. Otis Elevator Company; to cooperatively examine the effects of vertical acceleration on the human body.
3. Local rubber company; to develop acoustic attenuation materials.

Our responsiveness and innovative marketing was recognized by the Federal Laboratory Consortium (FLC) as the first lab of the month from over 700 competitors. Shortly thereafter, we received the FLC Southeast Regional Coordinator's Excellence Award for our exceptional efforts and leadership role in the technology transfer arena. The secretary of the Navy recognized our technology transfer accomplishments, noting that we helped the Navy remain in the forefront of shaping the nation's science and technology future.

All of these efforts enabled the command to move Navy technology out of the laboratory and into the marketplace, which ultimately results in higher productivity and more jobs. Our leadership role in marketing our innovative research technology prompted NMRDC to task us with developing a viable technology transfer marketing strategy for all Navy medical research and development (R&D) laboratories.

CALENDAR YEAR 1994 PLANS

In 1994, we will continue to broaden our technology transfer opportunities. Through innovative approaches, this laboratory has found success in areas that were previously unexplored. The technology transfer arena is full of untapped resources and possibilities that could benefit military and civilian sectors. I look forward to working with all facets of the research and development community at the DoD, local, state, regional, and national level to promote biomedical research and development.

Currently, CRDAs are pending with a pharmaceutical company to study the effects of certain drugs on aviation performance, and several major universities to study ocular scan patterns and conduct digital computer modeling of night vision devices. Technology Transfer represents the future of the medical research and development community. By sharing information in a constructive manner, both the Navy and civilian sectors will benefit greatly.

OFFICE OF THE CHIEF SCIENTIST

Thrust: Scientific Excellence

Chief Scientist **James D. Grissett**, Research Physiologist
Ph.D., Virginia Commonwealth University Medical
College of Virginia, Richmond, VA, 1970, physiology

Dr. Grissett has conducted research in several areas at NAMRL for over 25 years: physiological effects of electric and magnetic fields, physiological factors affecting tolerance to high acceleration forces, vestibular physiology associated with spatial disorientation and motion sickness, and mathematical models of central nervous system processing of vestibular sensory information. He has served on national and international committees for the development of standardized human performance assessment methodology.



AIMS AND OBJECTIVES

By collateral duty assignment, the chief scientist advises the commanding officer on issues affecting research programs. Recommendations to principal investigators are made through the Science Advisory Board, which the chief scientist chairs. Other responsibilities include reviewing laboratory manuscripts for scientific content and validity, and serving as advisor to the Committee for the Protection of Human Subjects.

SIGNIFICANT ACCOMPLISHMENTS

The laboratory was represented at numerous professional meetings during 1993, that included six poster presentations and 44 scientific papers. Scientific research was presented in 48 publications, and 12 abstracts have been accepted for presentation during 1994.

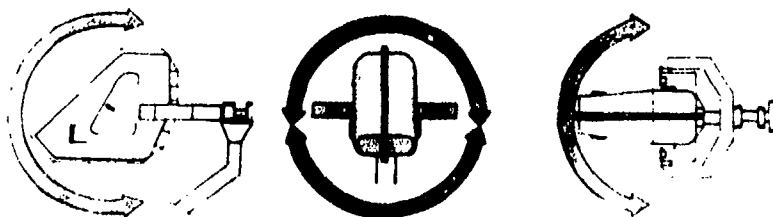
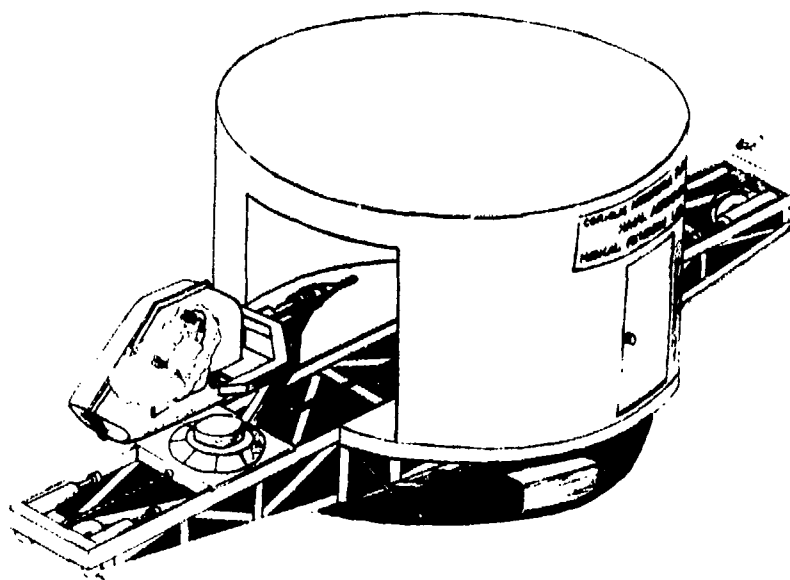
A major accomplishment for the laboratory was the approval of a 3-year (FY95-97) Advanced Technology Demonstration (ATD) concept proposal for a Tactile Interface to Improve Situational Awareness. Additionally, one of three Accelerated Research Initiatives to be briefed in 1994 is from this laboratory, "Effects of Microwave Radiation on Cognitive Performance."

The laboratory hosted several symposia this year: "Performance Based Testing Working Meeting," the "TARP" meeting with Wright Patterson, the "Tri-service Aeromedical Research Panel Fall Technical Meeting," the "NMRDC 1993 Commanding Officer's Conference," and the "Aviation Performance-based Testing Workshop." We also co-hosted meetings with the U.S. Army Aeromedical Research Laboratory, U.S. Army Safety Center, and the U.S. Navy Safety Center for the "Spatial Disorientation in Helicopters and its Operational Consequences Conference" and the "Long- and Short-term Solutions to Reducing Disorientation Mishaps Workshop."

CALENDAR YEAR 1994 PLANS

We will maintain a strong technology base in those scientific disciplines that have an enduring relationship to Navy and Marine Corps aviation. These areas include vision physiology, vestibular physiology, acoustical sciences, and human performance assessment. We have submitted new proposals that address current fleet problems in these areas.

RESEARCH



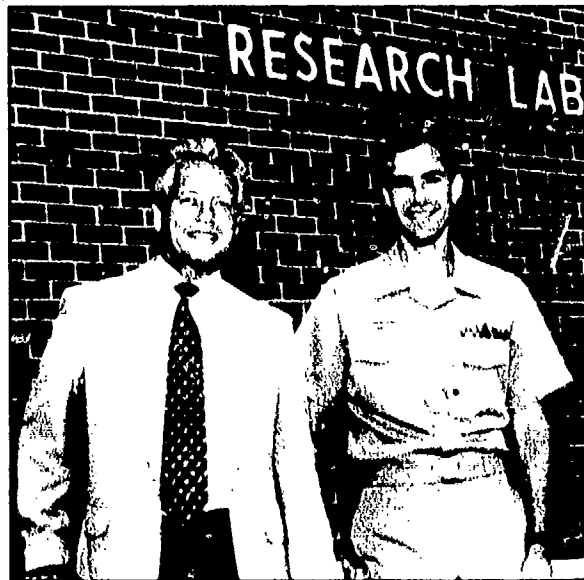
RESEARCH DEPARTMENT

Thrust: **Research Support of Operational Fleet**

Department Head: **John O. de Lorge**, Research Psychologist
Ph.D., University of North Carolina, Chapel Hill, NC,
1964, experimental psychology

Dr. de Lorge has been with the laboratory for over 25 years as a research psychologist. His work began with research on the original "Orbiting Primate Experiment," a collaborative project with NASA, and eventually incorporated research on the biological effects of electromagnetic radiation. He is an internationally recognized investigator in the psychological effects of nonionizing radiation and is regularly invited to contribute his knowledge in this area. He has authored or coauthored over 60 scientific articles.

The Department consists of six divisions that conduct research in aviation medicine and related areas. The research staff includes three GM-15s, one GM-14, three GM-13s, and 30 other civilians. Approximately the same number of military personnel are also assigned to this department. The combined research staff includes 18 Ph.D.s, M.D.s, O.D.s, or other professional degrees, 4 master's degrees, and 15 college graduates.



Assistant Department Head: **Michael H. Mittelman**, CDR MSC USN, Optometrist, Aerospace Physiologist
(from Aug)

Staff:

Carla L. Doss, SPC USA, Veterinary Technician (from Jul)
Robert E. Ford, HMCS(SW) USN, Department Leading Chief Petty Officer
Newton H. Foster, MAJ USAR VC, Veterinarian (to Sep)
Billy W. Howard, MAJ USA VC, Veterinarian (from Sep)
Anna D. Johnson, Secretary (Stenography)
Barry D. Jacobsen, ET1(SW) USN, Electronics Technician
Arthur R. Nelson, Electronics Technician
Belinda L. Thompson, SPC USA, Veterinary Technician
Franklyn E. Thrasher, Biological Laboratory Technician

AIMS AND OBJECTIVES

The Research Department is responsible for all of the research efforts in the laboratory. Basic and applied research in aviation medicine and related sciences are carried out in the laboratory and in the field. Research teams frequently travel to various operational areas to collect data. Individual investigators serve as a resource to the operational fleet, NASA, and other federal agencies in their areas of expertise. Laboratory research facilities are available to university faculty and postdoctoral fellows through various visiting scientist programs and collaborative research arrangements. In addition, residents in the aerospace medicine program

at the Naval Aerospace and Operational Medical Institute (NAMI) frequently gain valuable research experience in our department.

The department consists of six divisions:

- Code 22 **Acceleration Division**
- Code 23 **Environmental Physiology Division**
- Code 24 **Aviation Performance Division**
- Code 25 **Aviation Selection Division**
- Code 26 **Sensory Sciences Division**
- Code 27 **Bioengineering Division**



ACCELERATION DIVISION

Thrust: Acceleration Research

Division Head: **Angus H. Rupert**, CDR MC USN
M.D., University of Toronto, Ontario, Canada, 1982
Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1978, neurophysiology

Dr. Rupert is a flight surgeon who has served in the U.S. Navy since 1985. As a well-known investigator in acceleration research, he is regularly requested to contribute his expertise in this area. His active research interests include basic research on mechanisms of spatial orientation and countermeasures to reduce the incidence of aviation disorientation mishaps. Secondary interests involve motion sickness, especially simulator sickness, air sickness, and space adaptation syndrome.



Assistant Division Head:
James C. Baker, CAPT MC USN
M.D., Case Western Reserve University, Cleveland,
OH, 1967

Division Personnel:

Amy Anderson, B.S., Research Assistant, University of West Florida
Deborah J. Bachmore, Secretary (Office Automation) (to July)
Donnie A. Bergeron, HM1 USN, Aerospace Physiology Technician (to Mar)
Wanda E. Chapman, HM2 USN, General Duty Corpsman (to Jun)
William C. Cohen, HM3 USN, General Duty Corpsman (from Nov)
Manning J. Correia, Ph.D., Intergovernmental Personnel Agreement, University of Texas, Galveston
Kristin J. Dube, B.S., Research Assistant, University of West Florida
Teneal Flowers, HMC(AW) USN, Leading Chief Petty Officer (from Nov)
JoAnn Ginsberg, Secretary (Office Automation) (from Apr to Sep)
James D. Grissett, Ph.D., Research Physiologist
Fred E. Guedry, Ph.D., NAMRL Professor Emeritus/NASA/University of West Florida
Michael D. Hayden, HM1 USN, Leading Petty Officer (from May)
Barry D. Jacobsen, ET1(SW) USN Electronics Technician (from May)
Edward S. Jarmul, Ph.D., U.S. Navy-ASEE Research Program Appointee; Red Cross Volunteer
Ben D. Lawson, Ph.D., Office of Naval Technology Postdoctoral Fellow
Joseph R. Lloyd, B.S., Physical Scientist (from Oct)
Charles A. Lowery, B.A., Electronics Technician
Braden J. McGrath, S.M, Biomedical Engineer, NASA/Universities Space Research Association
Andrew M. Mead, LT MSC USNR, Aerospace Experimental Psychologist (from Feb)
Efrain A. Molina, M.S.E.E., M.A., Supervisory Electronics Engineer
Ferdinand H. Rameckers, Ph.D., Flight Psychologist, Royal Netherlands Air Force (from Aug)
Hidde G. Rameckers, Trainee, Technische Hageschool, Rijswijk, Netherlands (from Nov)
Willem C. Tielemans, Col, Flight Surgeon, Royal Netherlands Air Force (from Aug)
Gene T. Turnipseed, B.S., Physicist
Roselind D. Williams, Student Aid (from Jul)
JoEllen Wolf, M.A., Secretary (Office Automation) (from Oct)
Philip K. Wolfe, A.S., Electronics Technician

AIMS AND OBJECTIVES

The Acceleration Division conducts basic and applied research to determine the physiological, perceptual, and psychophysiological responses to motion-induced stimuli associated with aviation and space environments. Spatial orientation, motion sickness, pilot selection, and G-tolerance (emphasizing sensorimotor and perceptual consequences) are the main subject areas under investigation. Research on the mechanisms of vestibular transduction is augmented by contracts with scientists from the University of Texas Medical Branch, Galveston, and the Massachusetts Institute of Technology. The Division also conducts research on G-tolerance that supplements dedicated programs at the Naval Air Development Center, United States Air Force School of Aerospace Medicine, and other laboratories.

SIGNIFICANT ACCOMPLISHMENTS

A major accomplishment was the approval of the 3-year (FY95-97) Advanced Technology Demonstration (ATD) concept proposal for a Tactile Interface to Improve Situational Awareness. We are currently developing an improved program of instructions in spatial disorientation for pilots, physiologists, psychologists, and flight surgeons (devices and procedures). Our Small Business Innovative Research (SBIR) on the Helmet-mounted Peripheral Vision Display has been advertised, and proposals are being submitted for review and evaluation. A second Vibrotactile suit (display) has been built for dual use capabilities as well as a design for improving hardware reliability through the use of an on-board microprocessor/controller.

Development of the NeuroCom Equitest NAMRL Modified Protocol was completed. Normative aviator data base information was collected and analyzed. Several studies were completed comparing motion sickness effects of head movements made during whole-body rotation.

New proposals addressing several aspects of spatial disorientation were approved. One program began in October to develop a vestibular test battery for in operational medicine. A new basic research program was approved to begin in FY95 to determine the effects of acceleration forces on virtual image displays and to develop methods to use virtual reality displays to reduce spatial disorientation. A new ATD was approved to begin in FY95 to develop a tactile interface between the aircraft attitude gyro and the aviator. A tactile interface system will improve awareness of aircraft orientation and thus reduce demand on the visual system to acquire attitude information. A mathematical model was developed for the interaction of canals and otoliths in perception of orientation, translation, and rotation in response to dynamic accelerations with six degrees of freedom.

A technique developed at MIT will provide differential stimulation of the otolith organs. This project provides an opportunity to give clinicians the capability of accurately lateralizing and quantifying otolith deficits. This is being transitioned to the 6.3 neuro-otological tests, and we are currently building equipment under the 6.4 vestibular test program.

CALENDAR YEAR 1994 PLANS

About 80% of funding for the new tactile interface program that begins in October will be on contract. In the current basic research program, the present mathematical model will allow future experiments to be designed more efficiently. Likewise, a model validated by the end of FY94 will allow the programs in FY95 to proceed more efficiently.

The installation of new human-rated capsules will improve the research capabilities of the CAP. Studies of perceptual and sensorimotor responses to oscillator linear acceleration will be conducted using the unique tracking capabilities of the CAP and the Otis Elevator Research Tower. Development of a helmet-mounted peripheral vision display, either as an adjunct to the vibrotactile display or as a stand-alone unit, is an important development to maintain spatial orientation awareness. The G-excess experiments will resume at Tinker AFB using a Navy Boeing 707 aircraft.

VESTIBULAR TEST DEVELOPMENT

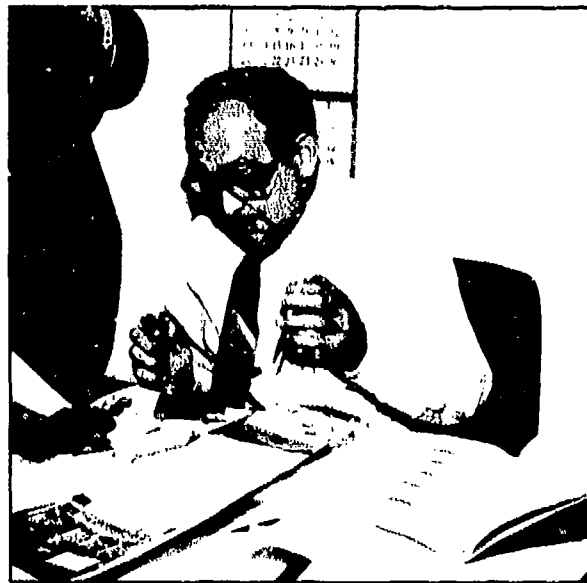
Thrust: Improve Standards for Selection and Training

Work Unit Number: 64771N M0933.002-7401 DN244586

Principal Investigator: Angus H. Rupert, CDR MC USN
M.D., University of Toronto, Ontario, Canada, 1982
Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1978, neurophysiology
See biography, page 12.

Work Unit Team:

Gene T. Turnipseed, B.S., Physicist
Joseph R. Lloyd, B.S., Physical Scientist (from Oct)
Braden J. McGrath, S.M., Biomedical Engineer,
NASA/Universities Space Research Association
Efrain A. Molina, M.S.E.E., M.A., Supervisory
Electronics Engineer



AIMS AND OBJECTIVES

This Non-acquisition Program Definition Document (NAPDD) seeks to improve standards for selection and training that will ultimately improve the quality of combat personnel operations in the aviation environment by matching capabilities to performance conditions.

The primary objective is development of a DoD capability to detect vestibular disorders incompatible with military aviation. Spatial disorientation (SD) is a triservice aviation problem that costs DoD in excess of \$300 million annually in destroyed aircraft. Spatial disorientation is the number one cause of pilot related mishaps in the Navy and the Air Force. The Naval Safety Center Aeromedical Newsletter 90-3 reports that for 1980-89 disorientation/vertigo was listed as the definite cause factor in mishaps that resulted in loss of 38 lives and 32 aircraft. The 91-3 Newsletter reports that during Desert Storm, four out of eight single pilot aircraft and three of six helicopter noncombat mishaps were due to SD. Brig Gen Rufus DeHart, Command Surgeon, USAF Tactical Air Command, reported "The most significant human-factors (HF) problem facing the TAF today is spatial disorientation (SD) followed by high-G loss of consciousness. Of all HF mishaps, 30% in the F-16 and 19% in the F-15 and F-4 are due to SD," (*Aviation Space and Environmental Medicine Vol. 57:725*). Many mishaps due to vestibular deficits are preventable if the expertise and assessment techniques are available.

SIGNIFICANT ACCOMPLISHMENTS

A unilateral otolith test chair has been designed, and construction of the test chair is planned. A Binocular ISCAN helmet has been completed and is ready for testing. The upgrade on the Periodic Angular Rotator (PAR) device is completed and we expect to put tests in place. We have added the capability to examine altimobaric vertigo on the Equitest.

CALENDAR YEAR 1994 PLANS

This program has transitioned from 6.3 to 6.4 funding. This will allow us to continue to develop a battery of vestibular function tests to measure both canal and otolith function and their interactions with sensory motor systems involved in spatial orientation.

PROJECTED PRODUCTS AND USERS

Cooperative efforts by the Naval Aerospace and Operational Medical Institute (NAMI) and the Naval Aerospace Medical Research Laboratory (NAMRL) have demonstrated that vestibular deficiencies can be detected with specialized research equipment. We have a complement of highly sophisticated equipment and staff that is currently utilized for conducting basic research on the physiology of motion and spatial orientation systems. As this research group develops a better understanding of these systems, they are also becoming more capable of detecting abnormalities. Army, Air Force, and Navy flight surgeons have sent a few acute cases to NAMRL for evaluation. The compromise to ongoing funded research posed by these evaluations limit acceptance of referrals to severe cases that have important value for existing research programs.

The ultimate goals are to 1) validate and transition screening tests currently available through NAMRL/NAMI devices and 2) select the best diagnostic tests from the battery developed by NAMRL for use in diagnosing clinical SD referrals and personnel identified by the screening tests.

This research and development effort includes development of a DoD vestibular assessment capability to assure that pilots have the necessary attributes to reduce SD mishaps. Clinical vestibular tests presently available to neurologists are at best, qualitative, highly subjective, and frequently uncomfortable to the patient. During the initial screening of aviators, the only test of vestibular function administered by flight surgeons is the 10-s Romberg (self balance) test, which can be passed by vestibular compromised subjects who have developed good nonlabyrinthine compensatory mechanisms. Often, aviators come to our attention late in flight training or after designation who do not have the necessary vestibular function to fly safely. The deficit, if detected, usually comes to the attention of the flight surgeon when the flight instructor observes a training problem and refers the student or aviator to the flight surgeon. Most frequently, vestibular deficits present as the inability to maintain controlled flight in instrument meteorological conditions when the pilot is deprived of outside visual references.

The final results of the research and development program will be the identification of the very best qualified personnel for pilots, improved aviator performance to enhance mission effectiveness, and reduction of costs attributable to SD mishaps.



SPATIAL AWARENESS IN NAVAL AVIATION

Thrust: Spatial Awareness

Work Unit Number: 63706N M0096.002-7056 Accession DN240540

Principal Investigator: Angus H. Rupert, CDR MC USN
M.D., University of Toronto, Ontario, Canada, 1982
Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1978, neurophysiology
See biography, page 12.

Associate Investigator: Fred E. Guedry, NAMRL
Professor Emeritus/NASA/University of West Florida
Ph.D., Tulane University, New Orleans, LA, 1953,
psychology

Work Unit Team:

Donnie A. Bergeron, HM1 USN, Aerospace
Physiology Technician (to Mar)

Wanda E. Chapman, HM2 USN, General Duty
Corpsman (to Jun)

Michael D. Hayden, HM1 USN, Leading Petty Officer
(from May)

Edward S. Jarmul, Ph.D., Biomedical Engineer, U.S.
Navy-ASEE Summer Faculty Research Appointee;
Red Cross Volunteer

Joseph R. Lloyd, B.S., Physical Scientist (from Oct)

Charles A. Lowery, B.A., Electronics Technician

Braden J. McGrath, S.M., Biomedical Engineer, NASA/Universities Space Research Association

Efrain A. Molina, M.S.E.E., M.A., Supervisory Electronics Engineer

Ferdinand H. Rameckers, Flight Psychologist, Royal Netherlands Air Force (from Aug)

Gene T. Turnipseed, B.S., Physicist

Philip K. Wolfe, A.S., Electronics Technician



AIMS AND OBJECTIVES

Phase I: To deliver a set of training paradigms compatible with available disorientation devices that will illustrate various forms of flight disorientation. Phase II: To identify and develop novel approaches to access aircraft orientation and aerial target information to pilots in a manner that complements present visual displays. Phase III: To evaluate concepts developed in Phase II with the training paradigms from Phase I.

SIGNIFICANT ACCOMPLISHMENTS

The major accomplishment was the successful development, submission, and approval of the 3-year (FY95-97) ATD concept proposal for a Tactile Interface to Improve Situational Awareness. The level of funding will allow for integration of research and development efforts among many research institutions; both hardware/software design and psychophysical relationships involved in vibrotactile information transfer. A Small Business Innovative Research (SBIR) request has been submitted for preliminary investigation of vibrotactor design/development. A visiting Dutch scientist is currently developing an improved program of instructions in spatial disorientation for pilots, physiologists, psychologists, and flight surgeons (devices and procedures). This includes paradigms to be used in association with the latest simulators that possess four

and five degrees of freedom of motion. We successfully submitted a request for an SBIR on the Helmet-mounted Peripheral Vision Display that has been advertised, and proposals are being submitted for review and evaluation. A second vibrotactile suit (display) has been built for dual use capabilities as well as a design for improving hardware reliability through the use of an on-board microprocessor/controller.

A paper entitled "The Use of a Tactile Interface to Convey Position and Motion Perceptions" was presented at an AGARD meeting in Lisbon, Portugal. LT Mead presented a paper entitled "A Tactile Interface to Prevent Spatial Disorientation" at the DoD Human Factors Engineering Working Group Meeting in San Diego, California.

CALENDAR YEAR 1994 PLANS

Development of a helmet-mounted peripheral vision display, either as an adjunct to the vibrotactile display or as a stand-alone unit, is an important development to maintain spatial orientation awareness. The G-excess experiments will resume at Tinker AFB using Navy Boeing 707 aircraft.

PROJECTED PRODUCTS AND USERS

Information derived from the development of training paradigms will be used by the Air Force and Navy when closed-loop spatial disorientation trainers are acquired. Military and civilian pilots will benefit from displays that present attitude information more naturally than head-up displays or attitude indicators.



SIMULATOR SICKNESS

Thrust: Development of a Measure of Balance/Coordination

Work Unit Number: 63706N M0096.002-7057 Accession DN240541

Principal Investigator: **Angus H. Rupert**, CDR MC USN
M.D., University of Toronto, Ontario, Canada, 1982
Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1978, neurophysiology
See biography.

Associate Investigator: **Fred E. Guedry**, NAMRL
Professor Emeritus/NASA/University of West Florida
Ph.D., Tulane University, New Orleans, LA, 1953,
psychology

Work Unit Team:

Wanda E. Chapman, HM2 USN, General Duty
Corpsman (to Jun)

William Cohen, HM3 USN General Duty Corpsman
(from Nov)

James D. Grissett, Ph.D., Research Physiologist

Michael D. Hayden, HM1 USN, Leading Petty Officer
(from May)

Joseph R. Lloyd, B.S., Physical Scientist (from Oct)

Brad J. McGrath, S.M., Biomedical Engineer,
NASA/Universities Space Research Association

Gene T. Turnipseed, B.S., Physicist



AIMS AND OBJECTIVES

The initial goal is to develop a measure of balance/coordination sufficiently sensitive to quantify the ataxia reported to occur following prolonged exposure to a varying acceleration field (e.g., motion-based simulators). When the time course of ataxia has been determined, scientifically based guidelines for the duration of pilot grounding following simulator sickness (SS) can be offered to the fleet. Intervention techniques to accelerate the time course of ataxia will be examined. Additional goals are to determine the efficacy of psychological intervention as a preventative measure to reduce motion sickness incidence in training and to improve the present treatment regime for motion sickness referrals.

SIGNIFICANT ACCOMPLISHMENTS

Development of NeuroCom Equitest NAMRL Modified Protocol was completed. Normative aviator data base information was collected and analyzed. By invitation, Braden McGrath presented "Postural Equilibrium Testing of Aviators: Normative Scores using the NAMRL Test Protocol" at the 5th Annual Symposium, "Diagnostic & Rehabilitative Aspect of Dizziness and Balance Disorders," Denver, Colorado.

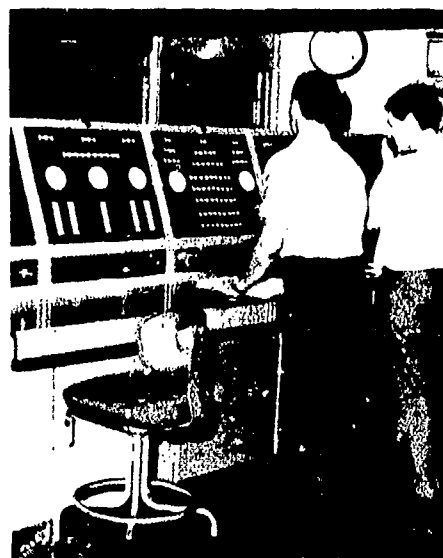
CALENDAR YEAR 1994 PLANS

We will continue to brief the Naval Training Systems Center in Orlando on our research project that has impact on their product development (e.g., our 6.1 program that reduces motion sickness in simulators by varying direction of visual displays and this simulator sickness program to develop an objective measure of

motion sickness presence following simulator exposure). Their input and recommendations will be forwarded to identify appropriate directions for further research.

PROJECTED PRODUCTS AND USERS

Guidance on duration of grounding following simulator sickness will affect all Navy pilots. An additional benefit may be the ability to objectively identify individuals experiencing mild symptoms of simulator sickness. The student pilot community has already benefitted from the Airsickness Prevention Program. The success rate demonstrated in returning sick pilots to the aeronautical environment has proven the value of physical desensitization combined with biofeedback/stress relaxation.



NEURO-OTOLOGICAL ASSESSMENT

Thrust: Sensory Motor Systems

Work Unit Number: 63706N M0096.001-7103 Accession DN241519

Principal Investigator: Angus H. Rupert, CDR MC USN

M.D., University of Toronto, Ontario, Canada, 1982

Ph.D., University of Illinois at Urbana-Champaign,

Urbana, IL, 1978, neurophysiology

See biography, page 12.

Associate Investigator: Fred E. Guedry, NAMRL

Professor Emeritus/NASA/University of West Florida

Ph.D., Tulane University, New Orleans, LA, 1953,

psychology

Work Unit Team:

Joseph R. Lloyd, B.S., Physical Scientist (from Oct)

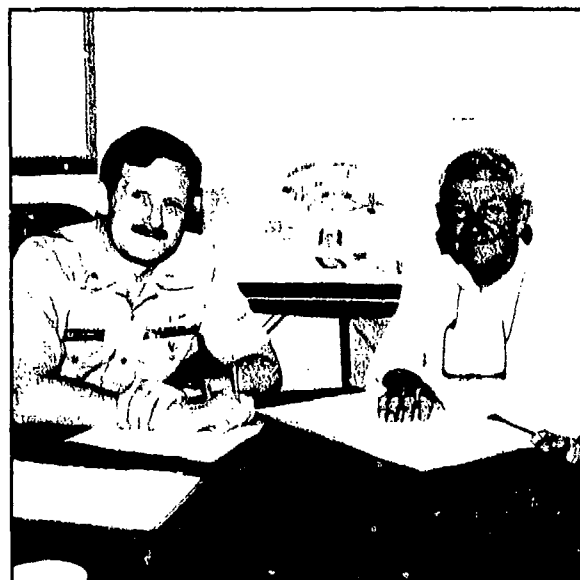
Braden J. McGrath, S.M., Biomedical Engineer,

NASA/Universities Space Research Association

Efrain A. Molina, M.S.E.E., M.A., Supervisory

Electronics Engineer

Gene T. Turnipseed, B.S., Physicist



Collaborators:

Robert Baloh, M.D., Neurologist, UCLA, School of

Medicine, Los Angeles, California

Alan Benson, M.D., RAF Institute of Aviation Medicine, England

Owen Black, M.D., Neuro-otologist, Good Samaritan Hospital, Portland, Oregon

Conrad Wall, Ph.D., Biomedical Engineer, Massachusetts Eye and Ear Infirmary, Boston, Massachusetts

David Zee, M.D., Neurologist, Johns Hopkins Hospital, Baltimore, Maryland

AIMS AND OBJECTIVES

In cooperation with the Naval Aerospace and Operational Medical Institute (NAMI), we plan to develop a battery of vestibular function tests to measure both canal and otolith function and their interactions with sensory motor systems involved in spatial orientation. For each test, the systematic collection of a statistically significant data base referenced to the Navy pilot community will enable NAMI to determine continued fitness for flight of aircrew referred by flight surgeons. A panel to include at least four nationally prominent neuro-otologists will meet annually to develop and review test procedures, provide consult service to NAMI, supply NAMI/NAMRL with appropriate clinical referrals, and when available, to aid in test validation. The product (6-8 tests) will be transferred to NAMI following clinical validation of each test.

SIGNIFICANT ACCOMPLISHMENTS

The Multi-station Disorientation Device (MSDD) motion has been accurately measured. We have not begun normative data collection yet. Dr. Clark, upon his return to Pensacola, will carry out the data collection. Protocol for the NeuroCom Equitest is complete, and the test is ready for field testing. We have integrated head movements into the protocol and are adding the capability to examine alternobaric vertigo. Colonel Moo Hoon Lee, an ear, nose, and throat doctor from South Korea, will complete data collection and compare

the two dynamic visual acuity tests. The Ocular Counter Roll (OCR) Device at MIT is being modified to include dynamic OCR. Horizontal linear oscillation tests were completed and a report is in preparation.

CALENDAR YEAR 1994 PLANS

This program has transitioned from 6.3 to 6.4 funding. This will allow us to continue to develop a battery of vestibular function tests to measure both canal and otolith function and their interactions with sensory motor systems involved in spatial orientation.

PROJECTED PRODUCTS AND USERS

As codeveloper of the test battery, NAMI will be the first to implement the tests when they become available. Until they can duplicate the battery, the Army and the Air Force may send referrals to NAMI and NAMRL. With a small but highly visible aircrew population, NASA has expressed interest in using these tests. Civilian referrals will be accepted and will provide the spectrum of dysfunction of the equilibrium and balance system.



PSYCHOPHYSICAL AND NEUROPHYSIOLOGICAL APPROACHES TO THE DYNAMICS OF SPATIAL ORIENTATION

Thrust: To Provide Accurate Reliable Information on Perceptual and Sensorimotor Reactions

Work Unit Number: 61153N MR04101.00F-7303 Accession DN243516

Principal Investigator: **Angus H. Rupert**, CDR MC USN
M.D., University of Toronto, Ontario, Canada, 1982
Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1978, neurophysiology
See biography, page 12.

Associate Investigator: **Fred E. Guedry**, NAMRL
Professor Emeritus/NASA/University of West Florida
Ph.D., Tulane University, New Orleans, LA, 1953,
psychology

Work Unit Team:

Amy Anderson, B.S., Research Assistant, University of
West Florida

Deborah J. Bachmore, Secretary (Office Automation)
(to Feb)

Wanda E. Chapman, HM2 USN, General Duty
Corpsman (to Jun)

William C. Cohen, HM3 USN, General Duty
Corpsman (from Nov)

Manning J. Correia, Ph.D., Intergovernmental
Personnel Agreement, University of Texas, Galveston

Kristin J. Dube, B.S., Research Assistant, University of West Florida

Teneal Flowers, HMC(AW) USN, Leading Chief Petty Officer (from Nov)

James D. Grissett, Ph.D., Research Physiologist

Michael D. Hayden, HM1 USN, Leading Petty Officer (from May)

Ben D. Lawson, Ph.D., Office of Naval Technology Postdoctoral Fellow

Joseph R. Lloyd, B.S. Physical Scientist (from Oct)

Charles A. Lowery, B.A., Electronics Technician

Braden J. McGrath, S.M, Biomedical Engineer, NASA/Universities Space Research Association

Andrew M. Mead, LT MSC USNR, Aerospace Experimental Psychologist (from Feb)

Efrain A. Molina, M.S.E.E., M.A., Supervisory Electronics Engineer

Ferdinand H. Rameckers, Flight Psychologist, Royal Netherlands Air Force (from Aug)

Hidde G. Rameckers, Trainee from Technische Hogeschool, Rijswijk (NR) (from Nov)

Willem C. Tielemans, Flight Surgeon Royal Netherlands Air Force (from Aug)

Gene T. Turnipseed, B.S., Physicist

JoEllen Wolf, M.S., Secretary (Office Automation) (from Sep)

Phillip K. Wolfe, A.S., Electronics Technician



AIMS AND OBJECTIVES

Recently, the Naval Research Advisory Committee identified spatial disorientation (SD) as the human factor in aviation physical stress having the greatest financial and operational impact on aviation mishaps. Spatial disorientation has been recognized as the most significant human factors problem in aviation mishaps by the

USAF. Spatial disorientation mishap incidence is expected to increase because of increased pilot workload, all-weather flight capability, and reduced proficiency due to reduced flight hours. Spatial disorientation is not limited to the aviation community but also poses a major problem to the Navy undersea diving and special warfare communities. Comparable information is available from Canada, England, and other allied nations.

Spatial disorientation is a very complex problem. All the body systems involved in the voluntary control of eye, head, and body motion relative to the Earth are intimately involved. These include the visual and vestibular systems, somatoreceptors (muscle, joint, and skin receptors), memory of preceding motion, expectation based on planned action, and sensorimotor interaction.

SIGNIFICANT ACCOMPLISHMENTS

Dr. Ben Lawson completed several studies in an experimental series comparing motion sickness effects of head movements made during whole-body rotation. He presented the results of the initial experiment in the series in Lisbon, Portugal, at the virtual reality conference hosted by AGARD.

In cooperation with NAMRL researchers, Dr. Manning Correia presented a paper on vertical optokinetic nystagmus at the David A. Robinson symposium in Eibsee, Germany.

Dr. Fred Guedry and LT Andy Mead have conducted experiments using the Human Disorientation Device (HDD) and the Coriolis Acceleration Platform (CAP) to compare the dynamics of linear oscillation perceptions. They noted on both the CAP and HDD that verbal reports were not very accurate estimations of the resultant pitch angle experienced. When a laser horizon operated with a joystick in the HDD was used during motion to report pitch angles experienced, results were quite accurate. Confirmation of this method as a useful subjective measure on the CAP awaits linear track recertification.

A mathematical model to predict perceptions produced by vestibular stimuli was developed by Dr. Jim Grissett. The experimental data to develop the model and refine it further are 1) NAMRL experiments carried out over the past 30 years, and 2) the ongoing experiments and those specifically planned for this project that will address key issues raised by the model.

Dr. Dan Merfeld (MIT) is developing a technique to provide differential stimulation of the otolith organs. This project provides an opportunity to give clinicians the capability of accurately lateralizing and quantifying otolith deficits. This is being transitioned to the 6.3 neuro-otological tests, and we are currently building equipment under the 6.4 vestibular test program.

Brad McGrath has completed an experiment detailing the effect of 3 G-units on the human vestibulo-ocular reflex. This will provide more information to be incorporated into the model at a later date.

CALENDAR YEAR 1994 PLANS

The installation of new human-rated capsules will improve the research capabilities of the CAP. Studies of perceptual and sensorimotor responses to oscillator linear acceleration will be conducted using the unique tracking capabilities of the CAP and the Otis Elevator Research Tower.

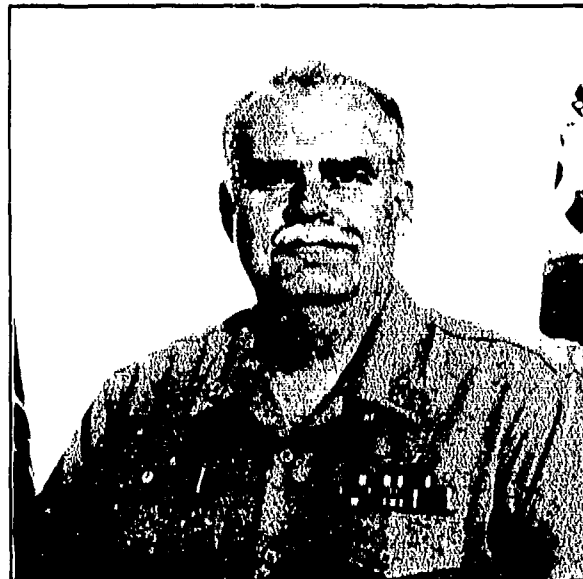


ENVIRONMENTAL PHYSIOLOGY DIVISION

Thrust: Physiological Responses to Potentially Hazardous Environments

Division Head: **Raymond P. Olafson**, CAPT MC USN
(from Nov)
M.D., Emory University School of Medicine, Atlanta,
GA, 1980
Ph.D., University of Louisville, Louisville, KY, 1972,
anatomy

D. Gary Smith, CDR MSC USN, Aerospace Physiologist
M.S. Miami University, Oxford, OH, 1967,
physiology (to Nov)



CAPT Olafson received his Navy commission in 1980 upon graduation from medical school and was assigned to the Naval Regional Medical Center, Portsmouth, Virginia, for training as an intern in the Internal Medicine Department. In December 1981, he was designated as a Naval Flight Surgeon and shortly thereafter began his first operational tour as the only flight surgeon assigned to the Naval Air Facility, Misawa, Japan. In this unique assignment, he worked in an Air Force Hospital and provided aeromedical care to pilots from all four services. He enjoyed a follow-on operational tour as Senior Medical Officer (SMO) in USS CONSTELLATION (CV-64). After a year in the Emergency Department at Madigan Army Medical Center, he was assigned to the Naval Aerospace Medical Research Laboratory (NAMRL), where he served in several administrative positions including acting executive officer, and finally as head of the Research Department. He returned to NAMRL in November 1993 after a 2-year tour at the Naval Medical Research and Development Medical Research Unit No. 2 in Jakarta, Indonesia, where he served as executive officer.

Division Personnel:

José M. García, HMI(AW) USN, Advanced Laboratory Technician
JoAnn Ginsberg, Secretary (Office Automation) (to Apr)
Sheila C. Hecht, LT MSC USNR, Radiation Health Officer
Tonya M. Lockhart, Office Automation (from May)
Marc D. Marcos, HMC(AW) USN, Leading Chief Petty Officer (to Jul)
Lloyd G. Meyer, M.Ed., Research Physiologist
H. Mike Neisler, III, Ph.D., Research Physiologist (to Jun)
Thomas L. Pokorski, LCDR MSC USN, Aerospace Physiologist
Jack L. Saxton, B.S., Research Physiologist

AIMS AND OBJECTIVES

The Environmental Physiology Division studies the biological effects of potentially hazardous environments associated with Navy and Marine Corps operations. Research is conducted to assess the effect of exposure to extreme temperatures. Investigations of nonfreezing cold injury and exposure to desert heat conditions reflect the capability of the Division to address and respond to fleet requests for data on physiological responses to any potentially adverse physical or chemical environmental agent.

Division research activities range from basic research to elucidate physiological, cellular, and biochemical mechanisms of response to advanced testing and evaluation of aircrew equipment. The data obtained are used to better understand the environmental insult, to guide more advanced developmental research, and to generate recommendations to counteract the environmental threat. These results are utilized in defining exposure limits, refining and evaluating personal protective equipment, and developing preventative procedures or techniques for adaptation.

An extensive biochemistry laboratory is maintained by the Division to conduct its research and to support the Laboratory's other projects as needed.

SIGNIFICANT ACCOMPLISHMENTS

Two projects were terminated in September of 1993. The results of these studies (1) Biochemical and Circulatory Response to Acute Cold Exposure and (2) Biochemical Response to Cold-induced Vascular Ischemia of Nonfreezing Cold Injury are being prepared for publication. The division will not be doing studies with primates in the near future.

The two ongoing studies, (1) Test and Evaluation of Aircrew Cooling Systems and (2) Aircrew Modified Equipment for Ladies in Aviation (AMELIA): Fleet Survey, reflect our current and future research emphasis on evaluation of human performance in response to various environmental stressors. Specific accomplishments for both of these projects are discussed in later sections.

CALENDAR YEAR 1994 PLANS

Congress has mandated that most combat-related jobs that do not involve direct contact with the enemy be opened to women. Aviation anthropometric restrictions will be revised to include up to 95% of females. We are entering a new era full of unanswered questions related to the health and safety of female aviators. We anticipate funding in 1994 to study gender-neutral standards for entry and completion of training that will reflect the actual physical requirements for operation of all naval aircraft in normal and emergency situations.



BIOCHEMICAL AND CIRCULATORY RESPONSE TO ACUTE COLD EXPOSURE

Thrust: Physiological Mechanism of Cold-induced Diuresis (CID)

Work Unit Number: 61153N MR04101.007-7052 Accession DN240511

Principal Investigator: Lloyd G. Meyer, Research Physiologist
M.Ed., University of Houston, Houston, TX, 1979,
exercise physiology

Mr. Meyer has 13 years of experience as a research physiologist with DOD, NASA, and universities. He has a background in mathematics and engineering as well as exercise and environmental physiology. During his 9 years at NAMRL, he has been an investigator on projects in environmental physiology, acceleration, sustained operations, and anthropometry. Mr. Meyer is a commander in the Naval Reserve and a staff officer in the 4th FSSG, USMCR. He has been involved in both cold-weather and desert operations with the Marines.



Work Unit Team:

José M. García, HM1(AW) USN, Advanced
Laboratory Technician

Jack L. Saxton, B.S., Research Physiologist

Belinda L. Thompson, SPC USA, Veterinary
Technician

Franklyn E. Thrasher, Biological Laboratory Technician (Animal)

Collaborators:

Melvin J. Fregly, Ph.D., University of Florida

Lewis B. Kinter, Ph.D., SmithKline Beecham

AIMS AND OBJECTIVES

The purpose of this research is to investigate and determine the specific endocrine involvement in the physiological mechanism of cold-induced diuresis (CID), with the intent of finding ways to ameliorate the dehydration that results from cold exposure. Cold-induced diuresis predisposes humans to dehydration affecting health and performance. The information from this work will be used to design pretreatment protocols or countermeasures for forces operating in cold environments. The hypothesis tested is that CID results from circulatory changes and shifts in the concentrations of hormones responsible for increasing urine production during cold-air exposure. Given this information, we propose to create a pharmacological intervention or pretreatment protocol that can be used to alter the hormonal response to cold in such a way that the diuresis will be negated, or at least reduced in degree. We assume that the peripheral vasoconstriction resulting from cold exposure leads to an increase in central venous return, increased central venous pressure, and atrial filling, leading to increased secretion of atrial natriuretic factor (ANF) and decreased secretion of arginine vasopressin (AVP). The changes in the concentrations of these hormones are presumed to result in the diuresis that has been observed in humans exposed to cold. An alternate theory is that only changes in AVP secretion are important in the cold response. This assumption takes into

consideration various other hormonal interactions, that is, norepinephrine and AVP. If CID is found to be controlled by specific changes in specific hormonal levels, then it may be possible to design a pharmacological scheme that will alter this hormonal response to cold and ameliorate the diuresis.

SIGNIFICANT ACCOMPLISHMENTS

From our previous work, we found a significant difference in the physiological response of the rhesus monkey to cold air exposure from that of humans. The experiments designed for this study this year should help explain these differences and lead to a partial fulfillment of the objectives of the research. We have conferred periodically with Dr. Melvin Fregly and Dr. Lewis Kinter on the progress and direction of our work. These interactions have been most helpful and stimulating.

The results of our studies have shown that the rhesus monkey does not experience CID and also exhibits an increase in AVP levels during cold exposure. This is contrary to the results of two other recent papers that showed the opposite response to cold exposure in humans and rats. In humans and rats, it was observed that AVP levels remain the same or decline while CID occurred. Thus, our monkey model provides a unique opportunity to study a paradigm that already has the response we think would be desirable in the human, namely to avoid a CID. The contrast among species may provide useful insight into the mechanism of this physiological response that would contribute to reaching the objectives of this project.

We collected sufficient information on the endocrine response to cold exposure with the intervention of 10 mcg of the AVP antagonist SK&F 105494. No differences from the standard cold tests were found. Additionally, we completed the test phase with the use of 30 mcg of SK&F 105494. This is the physiological dose level that has been shown to reduce the circulating AVP level and cause CID in the monkey. We did not see any noticeable increase in urine flow as a result of the SK&F 105494, nor did we observe a significant change in hormone levels different from the cold tests without the SK&F 105494 except for norepinephrine, which increased significantly in the cold with the SK&F 105494. We concluded that AVP may not be the primary influencing factor in CID, and that the AVP antagonist SK&F 105494 had minimal effects on the diuretic and natriuretic response of the monkey when exposed to cold air.

This work unit was terminated in September 1993.

PROJECTED PRODUCTS AND USERS

Information developed from this project may be used to provide improved guidelines and procedures for maintaining adequate hydration levels during exposure to cold. Potential users of this information include operational forces (air, surface, and land-based) of the Navy and Marine Corps, other DoD agencies, and civilian authorities concerned with wilderness medicine.



BIOCHEMICAL RESPONSE TO COLD-INDUCED VASCULAR ISCHEMIA OF NONFREEZING COLD INJURY

Thrust: **Thermal Stress**

Work Unit Number: 61153N MR04120.00B-7049 Accession DN241518

Principal Investigator: **H. Mike Neisler, III**, Research Physiologist
Ph.D., University of Southern Mississippi,
Hattiesburg, MS, 1989, exercise physiology (to Jun)

Dr. Neisler is board-certified as a Bioanalyst Clinical Laboratory Director by the American Board of Bioanalysis and licensed in Florida as a Clinical Laboratory Director. He has over 20 years of clinical laboratory, laboratory management, and research experience. He completed the third year of an American Society for Engineering Education/Office of Naval Research Postdoctoral Fellowship at NAMRL and was hired as a research physiologist. His active research interests include temperature physiology, cellular immunology, and biochemical responses to various environmental stimuli.



Associate Investigator: **Jack L. Saxton**, Research Physiologist
B.S., University of West Florida, Pensacola, FL, 1975, biology

Work Unit Team:

José M. García, HM1(AW) USN, Advanced Laboratory Technician
Franklyn E. Thrasher, Biological Laboratory Technician (Animal)

AIMS AND OBJECTIVES

Thermal stress is a major source of degradation of performance and health of naval personnel under operational conditions in cold weather. Among the problems related to this degradation are peripheral neuropathy and tissue damage from nonfreezing cold injury (NFCI). Little attention has been paid to the direct cellular response and pathophysiological mechanisms of nonfreezing cold injury. A literature search has produced limited data describing the functional status of the oxygen-free radical (OFR), OFR-protective mechanisms at the cellular level during NFCI, or subsequent inflammatory mechanisms. Recent information emerging from the diverse fields of cardiology, clinical chemistry, immunology, myology, and sports medicine each contain relevant new perspectives of conditions that have remarkable similarities with descriptions of nonfreezing cold injuries. We hypothesize that the mechanisms of NFCI are similar to the documented changes in other ischemic tissues. Therefore this project may also have implications for TMRs in Hypovolemic Shock and Hemodynamic Problems and Multiple Organ System Failure. From these perspectives, we will provide basic research data concerning alterations in OFR and subsequent cellular biochemical inflammatory mediators from the cold-induced vascular ischemia that occurs in NFCI.

Specifically, we hypothesize that a) tissue ischemia resulting from cold-induced vasoconstriction will produce alterations in the OFR scavengers as measured by differences in concentrations of oxidized and reduced

glutathione and superoxide dismutase between the arterial and venous samples in the experimentally cooled limb and in venous samples across the sampling times; b) increased cellular catabolism of ATP will result in increasing concentrations of venous hypoxanthine as a substrate for further OFR production during and after cold-induced vascular ischemia; c) stimulation of an inflammatory response will induce complement activation, cytokine and lymphokine production during the early phase of reperfusion, which will perpetuate tissue damage; d) leukocyte stimulation will result in alterations in the number and status of polymorphonuclear and monocytic cells further extending tissue damage; and e) understanding of the sequential, cumulative biochemical nature of NFCL will allow development of prophylactic and treatment protocols to reduce susceptibility to and morbidity from NFCL. This project will develop the rhesus monkey as a model for investigation of the pathophysiological processes of NFCL.

SIGNIFICANT ACCOMPLISHMENTS

Experimental exposures have been completed using both ketamine and halothane anesthetics. The modified procedures have been validated for use on the new Monarch 661-10F chemistry analyzer, and analysis of the samples has begun.

CALENDAR YEAR 1994 PLANS

Biochemical analysis of the samples will be completed. The data will be analyzed for alterations in OFR scavengers and stimulation of an inflammatory response. The results will be published in a final report.

PROJECTED PRODUCTS AND USERS

The ultimate products of this research are prophylactic and/or treatment protocols to prevent the biochemical alterations that occur during NFCL. Potential users of this information include operational forces of the Navy, Army, Marine Corps, other DoD agencies, and civilian agencies concerned with wilderness medicine.



TEST AND EVALUATION OF AIRCREW COOLING SYSTEMS

Thrust: Evaluate Personal Aircrew Cooling Systems

Work Unit Number: Reimbursable Accession DN242633

Principal Investigator: Lloyd G. Meyer, Research Physiologist
M.Ed., University of Houston, Houston, TX, 1979,
exercise physiology
See biography, page 26.

Work Unit Team:

José M. García, HM1(AW) USN, Advanced
Laboratory Technician

Jack L. Saxton, B.S., Research Physiologist

Michael E. Stiney, HM2 USN, Leading Petty Officer,
Cardiovascular Technician



AIMS AND OBJECTIVES

The purpose of this study is to test and evaluate personal aircrew cooling systems. Significant crew heat stress and dehydration occur under operational conditions in hot and humid, and dry and hot environments. It is generally accepted that heat stress can adversely affect human performance and compromise safety. Personal cooling systems have been used for body cooling with much success in the U.S. space program and in industry. This work will test and evaluate liquid-cooled systems designed for individual use. The results of this study will identify aircrew cooling systems that effectively contribute to the homeostasis of body temperature in simulated desert conditions relevant to helicopter operations. An effective personal aircrew cooling system will provide relief from the adverse physiological and psychological effects of heat stress, improve crew comfort in the aircraft, and may enhance performance in hot environments.

SIGNIFICANT ACCOMPLISHMENTS

We completed 18 tests with 6 subjects using a liquid-cooled personal microclimate cooling system with the added burden of a full-body chemical protective ensemble. Subjects were exposed to 49 °C, 15% relative humidity for 2 and 3 hours in an 8x10x8 ft environmental chamber. The initial 15 min of each trial was performed without cooling. Cooling was provided for the remainder of the test. When cooling was in effect, water temperature entering the Exotemp shirt was kept constant at 22 °C. The flow rate of the water in the shirt was maintained at 0.15 gallons per minute.

Body core temperature was measured with a rectal thermistor. Skin temperatures were measured at four sites: arm, chest, thigh, and calf. A three-lead electrocardiogram was monitored and used to determine heart rate. Subjects were allowed to drink water *ad libitum* throughout the test. Both nude and clothed weight was measured before and after the test. Sweat loss was calculated from weight lost and water ingested. The torso cooling system configuration was effective in maintaining core and mean skin temperatures within normal physiological limits at rest and during exercise. Subjectively, all subjects reported feeling cooler and perceived a lower exertion level with the cooling system. The cooling system, as configured in these tests, met the engineering requirements for cooling. The system functioned to maintain the physiological responses of the subjects within normal limitations.

CALENDAR YEAR 1994 PLANS

We will conduct tests of the liquid cooling system used in the 1993 test. Chemical protective flight clothing will be worn, and the subjects will be exposed to the same environmental conditions, 49 °C, 15% relative humidity, for 3 h. In addition to the temperatures and cardiological measures, we will directly assess the metabolic workload of the heat and exercise on the subjects. This is a reimbursable project for the Naval Air Warfare Center, Warminster, Pennsylvania, to aid in the development of a personal microclimate cooling system for helicopter aircrew.

PROJECTED PRODUCTS AND USERS

Initially, the main users of these results will be helicopter aircrews. We will provide the results of our tests to Naval Air Systems Command for use in the development and delivery of personal microclimate cooling systems for helicopter aircrews. This work may lead to the future development of personal cooling ensembles for fixed-wing aircrew.



AIRCREW MODIFIED EQUIPMENT FOR LADIES IN AVIATION (AMELIA): FLEET SURVEY

Thrust: Identify Fit Problems With Current Aviation Life Support Systems (ALSS)

Work Unit Number: Reimbursable

Principal Investigator: **Thomas L. Pokorski**, LCDR MSC USN
Ph.D., University of Florida, Gainesville, FL, 1992,
health behavior

LCDR Pokorski is a designated Aerospace Physiologist with over 20 years of naval experience. His educational background is in health science education with emphasis in health promotion and health behavior change. His recent dissertation work involved survey and educational treatment for smoking cessation with Navy recruits. His interests are in survey construction and analysis, strategies for health behavior change, smoking cessation, and anthropometry.

Associate Investigator: **D. Gary Smith**, CDR MSC USN
M.S., Miami University, Oxford, OH, 1967,
physiology

On-site Data Coordination:

Daniel F. DeMaso, ENS USN (to Aug)
José M. García, HM1(AW) USN, Advanced
Laboratory Technician
Joe MacKay, ENS USNR (to Dec)
Andrew G. Walsh, ENS USNR (to Aug)

Off-site Interviewers: Apr-Aug 1993

Tamara Accardo-Jones, LT MSC USNR, Aerospace Physiologist
Martha Andrews, LT MSC USNR, Aerospace Physiologist
Barbara Boyd, LCDR MSC USN, Aerospace Physiologist
Robin Craig, LT MSC USNR, Aerospace Physiologist
Roy Helton, LCDR MSC USN, Aerospace Physiologist
Helen Karl, PR1 USN, Aviation Survival Equipmentman
Judy Strand, LT MSC USNR, Aerospace Physiologist
Gretchen Wavell, LT MSC USN, Aerospace Physiologist

AIMS AND OBJECTIVES

Objectives of this project are to survey all female aviation personnel in the Navy for problem with proper fitting of aviation life support systems (ALSS). The overall AMELIA project is sponsored by the Naval Air Systems Command (NAVAIRSYSCOM), and Naval Air Warfare Center (NAWC), Warminster, is the lead lab. Our role was to develop a survey instrument, coordinate the survey effort, and analyze the results.



SIGNIFICANT ACCOMPLISHMENTS

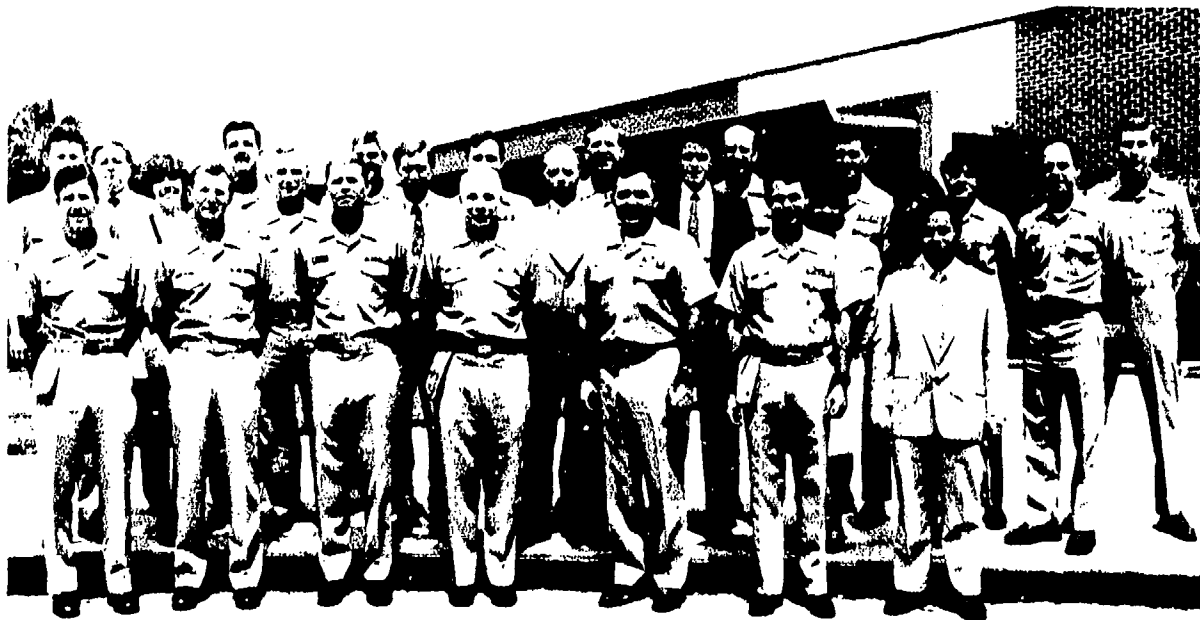
The survey was conducted between May and August 1993. Two survey instruments were used: A 27-page interview form and a 5-page mail-out form. Personal interviews were conducted mainly by female Aviation Medical Safety Officers (AMSOs) and one female aviation survival equipmentman. Surveys were mailed to individuals who could not be reached by interviewers. Sixty-six percent (N-341) of the 514 female aviation personnel in the Navy completed surveys. Analysis of the data was begun, and a report will be published in early CY94. Program management reviews were conducted at NAWC Warminster in September and NAVAIRSYSCOM in October.

CALENDAR YEAR 1994 PLANS

Ongoing analysis of data will be completed, and a research report will be compiled and published. Part of the survey addressed problems encountered with urine collection devices. We will be involved in assessment of female-specific urine collection devices to be fielded as an interim fix for this problem.

PROJECTED PRODUCTS AND USERS

The information obtained through the survey will be used by NAWC Warminster to evaluate current sizing standards for ALSS. Data will be used to recommend changes to current sizes to allow a better fit for female aviators. Data will also be used to assist development of new urine-collection devices and by NAVAIRSYSCOM in suggesting aircraft design modifications to accommodate a larger range of individuals.



AVIATION PERFORMANCE DIVISION

Thrust: 1) Microwave Radiation Effects on Performance, 2) Effects of Lasers on Visual Performance, and 3) Sustained Operations

Division Head: John A. D'Andrea, Supervisory Research Psychologist
Ph.D., University of Utah, Salt Lake City, UT, 1976,
psychology

Dr. D'Andrea's educational background includes physiological and experimental psychology. He has specialized in the investigation of electromagnetic radiation (ELF, microwave, and visible light) effects on behavioral performance and physiology. He has 21 years experience in behavior and EMR research and has published 45 research articles and reports and 2 book chapters. He has much experience in dosimetry of microwaves and biological targets using calorimetric methods. In addition, he has expertise in statistics and experimental design as well as methods of behavioral analysis.



Division Personnel.

Wanda E. Chapman, HM2 USN, General Duty
Corpsman (to Nov)

Peter D. Collyer, B.S., Computer Systems Programmer

Michael A. Cross, HM2 USN, General Duty Corpsman

Teneal Flowers, HMC(AW) USN, Leading Chief Petty Officer (to Oct)

Donald J. Hatcher, A.S., B.Th., Electronics Technician

Diana D. Jones, HM3 USN, General Duty Corpsman (from Feb)

Andrew H. McCardie, M.A., Research Psychologist

David L. McKay, LT MSC USNR, Research Psychologist

Michael D. Reddix, LT MSC USNR, Aerospace Experimental Psychologist

Jon F. Sheeley, B.A., Computer Operator (to Oct)

Robert R. Stanny, Ph.D., Research Psychologist

Michael E. Stiney, HM2 USN, Leading Petty Officer, Cardiovascular Technician

Alfred Thomas, B.A., Research Psychologist

Margaret G. Tracy, Secretary (Typing)

Robert K. Upchurch, Biological Laboratory Technician (Animal)

Douglas A. Wiegmann, LT MSC USNR, Aerospace Experimental Psychologist

AIMS AND OBJECTIVES

The Aviation Performance Division conducts research to determine the physiological and psychological effects that unique Navy and Marine Corps operational environments may have on human performance. By assessing performance under complex, high-demand, multitask conditions that simulate operational missions, Division scientists can quantify degradation effects and then develop performance enhancement techniques.

A multidisciplinary performance test battery, designed and developed by Laboratory personnel, is the Division's primary tool for its sustained operations (SUSOPS) research. Using fleet-recommended scenarios for cyclic operations, one protocol determines the type of performance degradation and when it will occur. A second research protocol then uses this information to develop biomedical or psychophysiological countermeasures.

The Division is also tasked with determining performance effects on personnel exposed to electromagnetic radiation (EMR), such as high-peak-power microwaves and low-energy lasers, associated with Navy equipment or the operational environment. The Division's EMR scientists are using an animal performance model to study behavioral and sensory effects resulting from high-peak-power-pulsed microwave radiation. This research will play a significant role in establishing safe exposure limits for personnel working in such environments.

Laser effects on visual performance is another major research project in the Division. Human subjects perform a visual search task while being exposed to very low energy laser radiation. Recommendations for windshield design, laser protection, or tactical doctrine are future products of this work.

SIGNIFICANT ACCOMPLISHMENTS

The SUSOPS project has achieved considerable visibility in the fleet briefing the squadrons on physiological and circadian effects of SUSOPS, and collecting subjective and cognitive performance data. The field studies and recent publication of results have served to increase the visibility of NAMRL's SUSOPS programs in the fleet, to the point where the fleet has solicited our input and invited our research.

The EMR scientists have completed several experiments to determine the effects of low-power lasers on human visual search performance. Volunteer subjects have demonstrated the effectiveness of low-level-laser-produced glare in masking targets. Targets hidden by glare result in significant increases in target search times and comparable losses in accuracy of identifying target locations.

Research conducted in the division to improve exposure standards for personnel working around high power radars and directed energy systems has continued. Recent experimental results by division EMR scientists will provide invaluable data for consideration during the upcoming safety standard revision.

Aviation Performance Division scientists produced 14 publications during calendar year 1993.

CALENDAR YEAR 1994 PLANS

Additional studies are planned for each task area. For example, a photic stimulation study has been initiated by the SUSOPS research team to evaluate performance degradation. Additional experiments are underway to examine the chronopharmacokinetics of methamphetamine and its major metabolite, amphetamine. This information will be used to evaluate the operational utility of methamphetamine as a pharmacologic countermeasure for SUSOPS in the fleet. Studies are continuing to evaluate high-peak-power microwave pulses. Factors such as peak power, pulse burst rate, and microwave frequency will be evaluated with auditory and visual behavioral tasks. Laser effects research to evaluate target detection performance and determine threat probabilities for mission planners will continue.



DEVELOPMENT OF BIOMEDICAL COUNTERMEASURES OF PERFORMANCE DEGRADATION FOR SUSTAINED FLIGHT OPERATIONS

Thrust: Sustained Operations

Work Unit Number: 62233N MM33P30.001-7001 Accession DN477519

Principal Investigator: **Robert R. Stanny**, Research Psychologist
Ph.D., Florida State University, Tallahassee, FL, 1980,
experimental psychology (psychobiology)

Dr. Stanny trained in human sensory and cognitive psychology, neuroscience, and quantitative research methods. His interests include the effects of stressors on human information processing, computational models of sensory and cognitive systems, psychological measurement, data-analysis methods, and computer techniques in biomedical and behavioral research. His recent research has included behavioral and neurophysiological studies of the effects of sustained work on attention and memory, drug effects, computational models of human performance, and Monte Carlo studies of statistical methods.



Associate Investigators:

Douglas A. Wiegmann, LT MSC USNR
Ph.D., Texas Christian University, Ft. Worth, TX,
1992, experimental psychology

David L. McKay, LT MSC USNR
Ph.D., California School of Professional Psychology, Los Angeles, CA, 1992, organizational psychology

Work Unit Team:

Wanda E. Chapman, HM2 USN, General Duty Corpsman (to Nov)

Robert E. Ford, HMCS(SW) USN, Department Leading Chief Petty Officer

Diana D. Jones, HM3 USN, General Duty Corpsman

Sam J. LaCour, Jr., Computer Programmer, Naval Computer and Telecommunications Station

Andrew H. McCardie, M.A., Research Psychologist

Michael E. Stiney, HM2 USN, Leading Petty Officer, Cardiovascular Technician

AIMS AND OBJECTIVES

Our first goal is to categorize the type and to quantify the magnitude of fatigue-induced performance degradation that occurs during sustained flight operations (SUSOPs). Secondly, we strive to develop biomedical (nonpharmacological) countermeasures to this performance degradation, thereby prolonging effective levels of aircrew performance. These countermeasures might take the form of bright light, nutritional aids, ultra-short naps, special exercise programs, et cetera. Our results are used to improve aircrew safety and mission effectiveness by providing a wide range of operationally relevant information on performance and endurance during SUSOPs and explicit guidance on the efficacy and use of the performance degradation countermeasures.

SIGNIFICANT ACCOMPLISHMENTS

Field Studies. Data concerning the effects of work/rest schedules on fatigue in flight deck personnel that was gathered during a carrier qualification exercise aboard USS SARATOGA (CV-60) from 26 January to 14 February 1992 were analyzed. Findings suggested that these individuals experience considerable fatigue due to sleep loss, which raises several safety issues. Follow-up observations of flight deck personnel were made during a carrier qualification exercise aboard USS KENNEDY (CV-64) from 18 to 29 July 1993. Preparation of a technical report summarizing significant findings is in its final stage of preparation.

A field study was also conducted to examine fatigue levels in AV-8B pilots during night exercises held at Twenty Nine Palms from 22 July to 12 August. Two major issues were addressed in this study. The first concerned the effectiveness of ramping procedures for shifting sleep/activity schedules. The second concerned the possibility that the long (3-week) exercise and the increasingly late flight schedules (which ranged to 0434 during the final week) might produce dangerously high levels of fatigue. A computerized performance test, along with a computerized fatigue questionnaire, were administered pre- and postflight. Analysis of the data suggested that ramping was effective in helping aviators maintain performance throughout the exercise. However, most still showed performance decrements and increases in subjective fatigue after flying. A letter report was written and submitted to CO, VMA-214. A technical report is in preparation.

Laboratory Studies. A laboratory study examining the behavioral effects of tyrosine during extended wakefulness was completed. Results of this investigation suggested that tyrosine has significant yet limited effects on performance during sleep loss. Tyrosine administration proved effective in slowing performance decline on a tracking task. Tyrosine showed a nonsignificant trend in reducing a) lapses on a vigilance task, b) subjective sleepiness, and c) the intensity of several fatigue-related symptoms. A technical report summarizing these findings was completed during CY93. Preparation of the manuscript for publication in an outside journal is in its final stages.



CALENDAR YEAR 1994 PLANS

Goals for laboratory research include plans to examine the behavioral effects of photic stimulation during periods of extended wakefulness. Preparations for this study were well underway by the end of CY93. Goals for field research include plans to further examine the effects of work/rest schedules on fatigue in personnel working the naval flight deck, as well as plans to continue studying the effects of nighttime flight on pilot fatigue.

PROJECTED PRODUCTS AND USERS

Guidelines aimed at flight surgeons, senior mission commanders, and squadron commanding officers regarding the use of nonpharmacologic countermeasures to fatigue will be produced. Many findings will also generalize to other naval communities (e.g., submarine, surface, special warfare) where applicable.

EFFECTS OF PSYCHOPHYSIOLOGICAL COUNTERMEASURES ON PERFORMANCE DECREMENTS DURING SUSTAINED FLIGHT OPERATIONS

Thrust: Sustained Operations

Work Unit Number: 63706N M0096.002-7010 Accession DN248502

Principal Investigator: **Robert R. Stanny**, Research Psychologist

Ph.D., Florida State University, Tallahassee, FL, 1980,
experimental psychology (psychobiology)
See biography, page 36.

Associate Investigators:

David L. McKay, LT, MSC USNR

Ph.D., California School of Professional Psychology,
Los Angeles, CA, 1992, organizational psychology

Douglas A. Wiegmann, LT, MSC USNR

Ph.D., Texas Christian University, Fort Worth, TX,
1992, experimental psychology

Work Unit Team:

Wanda E. Chapman, HM2 USN, General Duty
Corpsman (to Nov)

Robert E. Ford, HMCS(SW) USN, Department
Leading Chief Petty Officer

Diana D. Jones, HM3 USN, General Duty Corpsman

Sam J. LaCour, Jr., Computer Programmer, Naval
Computer and Telecommunications Station

Andrew H. McCardie, M.A., Research Psychologist

Michael E. Stiney, HM2 USN, Leading Petty Officer, Cardiovascular Technician



AIMS AND OBJECTIVES

Objectives of this project are to select and evaluate potential psychophysiological enhancement agents for use during multiple long-range flight operations and to determine the effects of the selected enhancement agents on cognitive performance, physiological status, and subjective fatigue.

We also contribute to improving aircrew safety and mission effectiveness by providing operationally relevant information on performance and endurance during sustained operations (SUSOPS) while employing pharmacological countermeasures. Our results are used in the development of proposed fleet guidelines for the use of the pharmacological enhancement agents in sustained flight operations.

SIGNIFICANT ACCOMPLISHMENTS

Dr. Stanny published two technical reports this year in conjunction with progress on the effects of *d*-methamphetamine in a sleep-deprivation study involving one night of sleep loss. The first report considered the effect of *d*-methamphetamine on memory during sleep deprivation. The second report investigated the effect of *d*-methamphetamine on vigilance and tracking. These two publications add to the data base of knowledge concerning the effects of stimulants on performance during simulated flight operations. In addition to the two technical publications, Dr. Stanny headed up a research team that investigated the effects

of fatigue during a long-duration transatlantic flight in F/A-18 Hornet aircraft involving Marine aviators from VFA-451 during exercise Battle Griffin. Results of the study yielded a great deal of information that will be used by military planners in future operations involving transatlantic flights. Two new researchers joined the SUSOPS team this year: LT David McKay and LT Douglas Wiegmann. Both researchers bring fresh new ideas to the project.

CALENDAR YEAR 1994 PLANS

Our ongoing analyses of methamphetamine as a potential performance maintenance agent continues to generate new information regarding the minimum effective doses and potential side effects. Future efforts will examine a new agent not yet researched by any other military lab within the United States. This new agent promises to be unlike other traditional stimulants previously studied. The manufacturer of this new agent reports fewer side effects and lower risks.

PROJECTED PRODUCTS AND USERS

Products include relevant information on performance and endurance during sustained flight operations and guidelines on the use and efficacy of fatigue countermeasures. Users and potential users include flight surgeons, flight operations officers, squadron commanding officers, and senior airwing commanders.



EFFECTS OF LASERS ON VISUAL SEARCH PERFORMANCE

Thrust: Evaluate Threat of Low-Power Lasers

Work Unit Number: 63706N M0096.002-7203 Accession DN247504

Principal Investigator: John A. D'Andrea, Supervisory Research Psychologist
Ph.D., University of Utah, Salt Lake City, UT, 1976,
psychology
See biography, page 34.

Associate Investigator: Michael D. Reddix, LT MSC
USNR
Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1989, educational psychology

Work Unit Team:

Michael Blanchard, B.S., Research Psychologist,
GeoCenters (to Jun)

Peter D. Collyer, B.S., Computer Systems Programmer



AIMS AND OBJECTIVES

The objective of this project is to determine the impact of low-level-laser-irradiation, producing a veiling glare, on cognitive performance in humans. Factors which must be investigated to validate and extend laser-glare research to the fleet were investigated and included the effects of, a) various *visual transparencies* (e.g., FV-2 laser protective eyewear), b) *alternatives to protective eyewear* for ameliorating the detrimental effects of laser glare in dawn/dusk and nighttime viewing conditions, and c) predictions of the *effective range of hand-held and other portable lasers relative to specific aircraft tactical maneuvers*.

SIGNIFICANT ACCOMPLISHMENTS

The first phase of field research (*determining the effective range of handheld lasers relative to specific aircraft tactical maneuvers*) was successfully completed at Naval Strike Warfare Center (NSWC). The goal of the field work is to establish baseline acquisition and tracking parameters for optically directed and manually steered laser weapons against selected TACAIR delivery profiles. Profiles of F18/B and A6 weapons delivery were monitored to determine the probability of a marksman, with a handheld weapon with optical sights, acquiring an aircraft at various time points within a weapons delivery profile. Our contribution to this effort is twofold: (a) assist in collecting valid data, and (b) producing threat charts depicting the probability of a marksman acquiring an aircraft at various time points within a specific weapons delivery profile and relative to a specific laser threat (e.g., retinal lesion, flashblindness, discomfort glare, or veiling glare) at acquisition slant ranges. The results of this preliminary investigation are classified as SECRET. Points of contact for this work are LT M. Reddix (NAMRL) and CDR D. Brown (NSWC).

We continue to study the *effects of low-level laser glare on pilot target detection performance* in dawn/dusk and nighttime viewing conditions. The interaction of target contrast, ambient light, and laser glare intensity on aviator target detection performance are being investigated. These studies are designed to determine the minimum level of irradiance, from a coherent light source, that will cause decrements in the visually mediated

performance (e.g., target detection) of aviators. In addition, the effects of laser protective eyewear (e.g., FV-2 laser protective spectacles) on aviator target-detection performance continue to be investigated.

CALENDAR YEAR 1994 PLANS

Laboratory research will examine contrast thresholds for target detection under conditions of laser glare. In addition, we will continue to evaluate laser protective eyewear as it is made available to us. Field research will focus on documenting, for mission planners, the probability of various hand-aimed (portable) laser threats to cause retinal lesions, flashblindness, discomfort, and veiling glare relative to specific aircraft weapons delivery profiles.



PROJECTED PRODUCTS AND USERS

Products. Research findings, relative to hand-aimed (portable) laser threats, will be presented in chart/table format indicating the slant ranges at which human performance decrements can be expected when various aircraft perform specific tactical maneuvers against specific laser threats under known atmospheric conditions. The probability of a pilot encountering retinal lesion, flashblinding, or glare effects at various slant ranges relative to a laser threat will also be depicted.

Users. Tactical aviation mission planners. Preliminary versions of 'laser' threat charts are currently being reviewed by mission planners at the Naval Strike Warfare Center.



BEHAVIORAL EFFECTS OF HIGH-POWER-PULSED MICROWAVE RADIATION

Thrust: Identify Microwave Radiation Effects on Performance

Work Unit Number: 62233N MM33130.OO2-7204 Accession DN277077

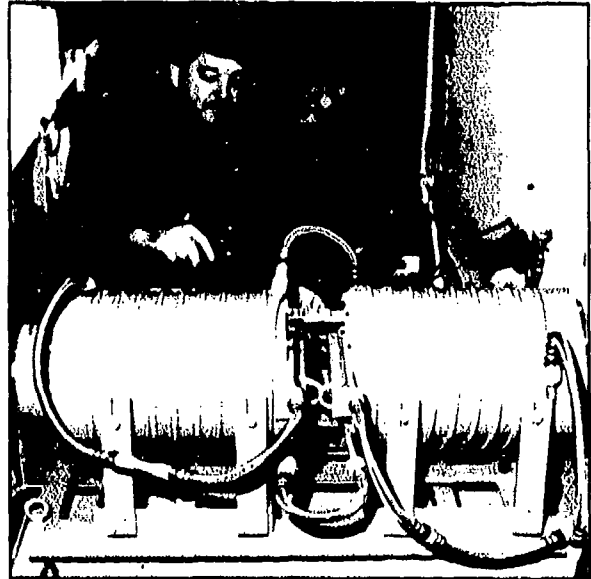
Principal Investigator: John A. D'Andrea, Supervisory Research Psychologist
Ph.D., University of Utah, Salt Lake City, UT, 1976,
psychology
See biography, page 34.

Work Unit Team:

Michael A. Cross, HM2 USN, General Duty Corpsman
Derrick Epps, HM2 USN, General Duty Corpsman (to Feb)

Donald J. Hatcher, A.S., B.Th., Electronics Technician
Alfred Thomas, B.A., Research Psychologist

Robert K. Upchurch, Biological Laboratory Technician (Animal)



AIMS AND OBJECTIVES

The main objective is to identify microwave radiation characteristics potentially hazardous to man associated with directed energy and radar systems. To do this, we determine the effect of radiation frequency, peak power, and pulse repetition rate on time-related and visual or auditory cognitive behavior in animals. Our results are used to determine the safe operating conditions and levels of exposure for Navy personnel working with directed energy systems.

SIGNIFICANT ACCOMPLISHMENTS

Two experiments were completed this year that determined no effect of high-peak-power-microwave pulses on visual spatial contrast sensitivity. Four research reports were published in 1993. In addition, Division scientists presented research results at five national and international research conferences during the year. Hearing tests were performed on nonhuman primates during microwave pulse exposure at whole-body specific absorption rate (SARs) of 1 and 2 W/kg. Results did not indicate any unique effects of high-peak-power-microwave pulses on the auditory system.

CALENDAR YEAR 1994 PLANS

The EMR research group will move operations to Brooks Air Force Base, Texas, during 1994. The scientists and technicians will join a Tri-Service research effort there comprised of research groups from the Air Force and Army evaluating microwave and laser bioeffects. Once the collocation is complete, research will continue to evaluate microwave high-peak-power pulses on monkey performance.

PROJECTED PRODUCTS AND USERS

The primary focus of this project is to examine microwave pulse effects on behavioral performance and psychophysical thresholds (auditory and visual) in the rhesus monkey and establish thresholds for effects to verify the adequacy of the 0.4 W/kg safe exposure standard for personnel that operate directed-energy systems and high-power radars. The Institute of Electrical and Electronics Engineers C95.1-1991 safety standard will be used by Navy and Marine Corps operational forces.



OCULAR EFFECTS IN MONKEYS OF HIGH-PEAK-POWER PULSED MICROWAVES

Thrust: To Determine If Low Average Power But High Peak Power Pulsed Microwaves Will Damage the Eyes of Nonhuman Primates

Work Unit Number: Accession DN240507

Principal Investigator: John A. D'Andrea, Supervisory Research Psychologist
Ph.D., University of Utah, Salt Lake City, UT, 1976,
psychology
See biography, page 31.

Associate Investigator:

John O. de Lorge, Research Psychologist
Ph.D., University of North Carolina, Chapel Hill, NC,
1964, psychology

Work Unit Team:

Alfred J. Mateczun, CAPT MC USN, Commanding
Officer

G. Daniel Prettyman, M.A., Biologist (to Jun)

Belinda L. Thompson, SPC USA, Veterinary
Technician (to Nov)

Barry J. Van Matre, B.A.S., Electronics Technician



AIMS AND OBJECTIVES

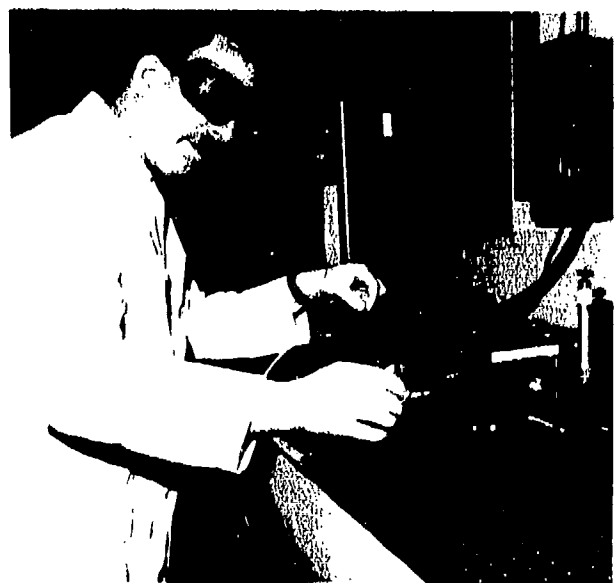
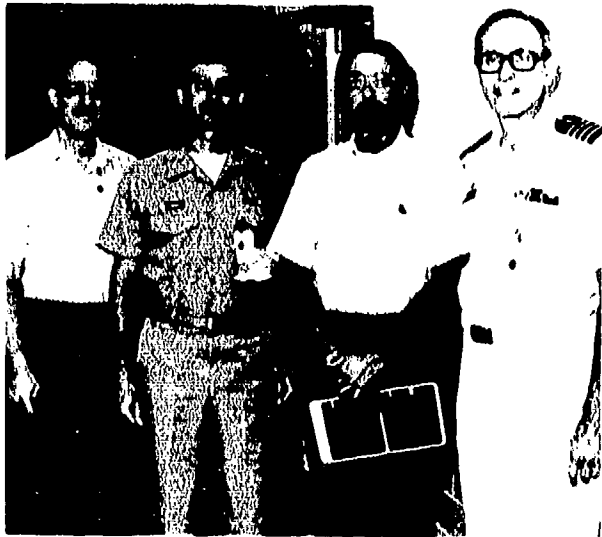
The primary objective of this study was to determine if relatively low average power but relatively high-peak-power pulsed microwaves will damage the eyes of nonhuman primates. Specifically, we hoped to determine if exposure of the nonhuman primate eye to high-peak-pulsed microwaves at a specific absorption rate of 4 W/kg or less can cause measurable pathological or physiological changes in the corneal endothelium or retina. The results could significantly impact on future deliberations of national and international bodies concerned with recommending the maximum permissible exposures (MPEs) for humans exposed to such fields.

SIGNIFICANT ACCOMPLISHMENTS

Exposure apparatus was installed and dosimetry experiments were conducted to determine exposure levels that produce a specific absorption rate in the retina of 4 W/kg.

CALENDAR YEAR 1994 PLANS

The research was terminated due to a lack of funding by the sponsor.

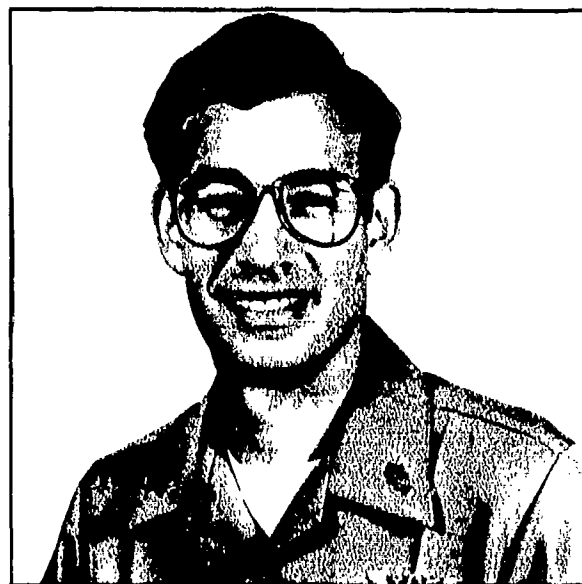


AVIATION SELECTION DIVISION

Thrust: Improve the Selection of Aviation Officers

Division Head: Daniel L. Dolgin, LCDR MSC USN
Ph.D., Illinois Institute of Technology, Chicago, IL,
1980, research psychology

LCDR Dolgin has worked as an aviation psychologist for the Navy for the past 11 years. During that time, he has managed the Navy and Marine Corps Aviation Officer Selection Test Battery and directed the development and validation of performance-based screening and prediction systems for Navy pilots, LCAC operators, test parachutists and commercial airline pilots. He is a member of the NATO Advisory Group for Aerospace Research and Development Aeromedical Panel. He is presently directing research efforts to identify psychological tests that will improve the selection of military aviators and commercial airline pilots and technology transfer/commercialization of laboratory capabilities.



Division Personnel:

David J. Blower, LCDR MSC USN, Aerospace
Experimental Psychologist

Allen D. Chapman, M.S., Computer Programmer, GeoCenters

Wade R. Helm, CDR MSC USN, Aerospace Experimental Psychologist, ADDU to Naval Aviation Schools
Command

Kathleen T. Helton, M.A., Personnel Psychologist

P. Mike Holmes, LCDR MSC USN, Aerospace Experimental Psychologist (from Aug)

Tatree Nontasak, Ph.D., Personnel Psychologist

David R. Street, Jr., LT MSC USNR, Aerospace Experimental Psychologist

AIMS AND OBJECTIVES

The Aviation Selection Division conducts research to improve the selection of aviation officers. Dual-task, psychomotor, and general information processing tests have been evaluated with regard to their ability to predict success or failure in all phases of flight training. These computer-based performance tests (CBPTs) have been developed to act in concert with the paper-and-pencil tests that the Navy currently uses to screen potential aviators.

We have attempted to address the prior issue of whether it is cost effective for the Navy to operationally implement new tests for selection. For example, our research has gone beyond simply trying to find the best cognitive tests and best statistical models to improve selection. We have attempted to phrase the question of implementation as an economic decision.

We are focusing on the improvements of Navy and Marine Corps Aviation Officer pilot selection through the automation of the aviation selection test battery. We continue to be involved in the implementation of the Landing Craft Air Cushion (LCAC) crew selection program that we developed. Other research opportunities have emerged in the area of commercial airline pilot selection.

SIGNIFICANT ACCOMPLISHMENTS

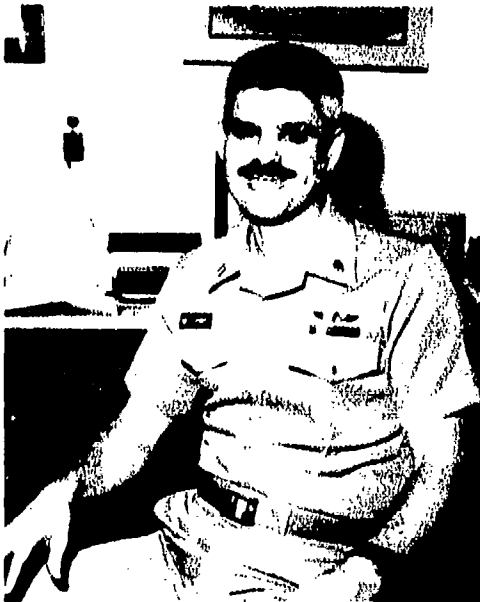
During 1993, six papers and three abstracts were published. Eight papers were presented at the 37th Annual Meeting of the Human Factors and Ergonomics Society, the Seventh Biennial International Symposium on Aviation Psychology, the 35th Annual Meeting of the International Military Testing Association, and the 64th Annual Scientific Meeting of the Aerospace Medical Association.

The reports produced by the division during 1993 address three broad areas of research. The first area concerns the value of computer-based psychomotor tests in the prediction of success in advanced naval flight training. The results in this area continue to support the addition of computer-based tests to naval flight training selection. The second area focuses on the value of personality tests and biographical inventories in prediction of naval flight training attrition. Research in this area has been promising. The third and final area addresses improvements to the selection of Landing Craft Air Cushion Vehicle crew.

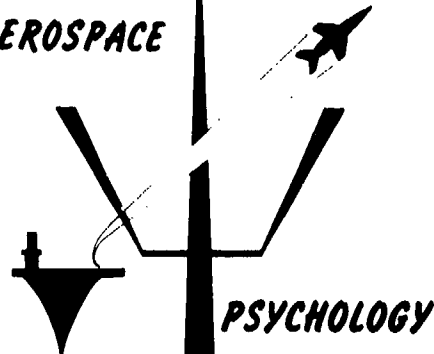
CALENDAR YEAR 1994 PLANS

The division will continue to address the value of personality and motivation in pilot training prediction. Plans call for analysis of the data bases for the NAMRL computer-based psychomotor tests and Landing Craft Air Cushion Vehicle crew selection to continue.

Also during 1993, various papers and abstracts were accepted for publication and presentation. These include three abstracts accepted for presentation at the 65th Annual Scientific Meeting of the Aerospace Medical Association in 1994.



AEROSPACE



VALIDATION OF A COMPUTER-BASED PSYCHOMOTOR TEST (CBPT) FOR THE SELECTION OF FEMALE NAVAL AVIATORS

Thrust: Female Aviator Selection

Work Unit Number: 61152N MR00001.001-7049 DN244503

Principal Investigator: **David R. Street, Jr.**, LT MSC USNR
Ed.D., Northern Arizona University, Flagstaff, AZ,
1984, educational psychology/educational testing and
measurement

LT Street brings to naval aviation selection research over 8 years of experience in applied clinical and school psychology with minority and very low incidence populations. His research expertise encompasses the development, application, and analysis of psychological tests. He is presently directing research efforts to develop and evaluate a computerized delivery system for the Navy/Marine Corps Aviation Selection Test Battery. He is especially interested in the performance characteristics of women and minorities on computer-based performance tests, especially personality and motivation tests in the prediction of success in naval pilot training.



Associate Investigator:

David J. Blower, LCDR MSC USN

Ph.D., Stanford University, Stanford, CA, 1980, experimental psychology/mathematical theories of
information processing

Work Unit Team:

Allen D. Chapman, M.S., Computer Programmer, GeoCenters

Daniel L. Dolgin, LCDR MSC USN, Aerospace Experimental Psychologist

Kathleen T. Helton, M.A., Personnel Psychologist

Tatree Nontasak, Ph.D., Personnel Psychologist

AIMS AND OBJECTIVES

This project is an Independent Research project that won national competition for funding by the Office of Naval Research. As women have the opportunity to fly combat aircraft, the selection tests currently designed primarily for men may no longer be valid for all applicants to naval aviation. The performance of women on computer-based tests such as the NAMRI, performance-based test battery is of particular concern. The performance characteristics of female aviators are explored.

SIGNIFICANT ACCOMPLISHMENTS

This project was a new start for 1993. Initial arrangements for the testing of approximately 100 female naval aviators have already been made. Testing will begin in January 1994 at various sites across the country. Efforts have been made to sample a cross section of female and male aviators from various communities.

including fixed and rotary wing. Research ties have already been established with Patrol Squadron 30 (VP-30) in Jacksonville, Florida, for the east coast.

CALENDAR YEAR 1994 PLANS

Plans call for testing a sample of male and female aviators matched as closely as possible on existing Aviation Qualification Test/Flight Aptitude Rating Scores and age. Trial testing of the NAMRL Computer-based tests has demonstrated that the tests are valid for selection. The division will also address differences in computer-based personality and motivation tests for male and females as part of this research effort.

PROJECTED PRODUCTS AND USERS

Our product will be a data base comparing the performance of male and female aviators on the NAMRL computer-based performance tests. Projected users of the information include the Navy Recruiting Command, Chief of Naval Air Training, Naval Aerospace and Operational Medical Institute, Bureau of Medicine and Surgery, and Chief of Naval Education and Training.



COMPUTERIZATION OF THE AVIATION SELECTION TEST BATTERY

Thrust: Aviator Selection

Work Unit Number: 63706N 0096.001-7302 Accession DN243515

Principal Investigator: **David R. Street, Jr.**, LT MSC USNR

Ed.D., Northern Arizona University, Flagstaff, AZ,
1984, educational psychology/educational testing and
measurement

See biography, page 48.

Associate Investigator:

David J. Blower, LCDR MSC USN

Ph.D., Stanford University, Stanford, CA, 1980,
experimental psychology/mathematical theories of
information processing

Work Unit Team:

Allen D. Chapman, M.S., Computer Programmer,
GeoCenters

Daniel L. Dolgin, LCDR MSC USN, Aerospace
Experimental Psychologist

Kathleen T. Helton, M.A., Personnel Psychologist

Tatree Nontasak, Ph.D., Personnel Psychologist



AIMS AND OBJECTIVES

A computerized Aviation Selection Test Battery (ASTB) can be combined with certain tests from the computer-based NAMRL performance-based test battery and the USAF BAT measures to improve the present paper-and-pencil based ASTB screening standards. The operational benefit is reduced attrition rates during all phases of flight training. These tests would help to reduce the number of candidates entering primary flight training, but would ensure that those who could pass these additional standards would have a higher probability of success. The increased number of candidates rejected through additional screening tests might seem to be a disadvantage, but it could very well match the intent of changed personnel policies brought on by the drawdown in military personnel mandated by the budget deficit and the reduction of tensions in Europe.

Automation of the ASTB will decrease administrative and editing errors and coding discrepancies. Because all item responses become part of an automated data base, future test revisions/revalidation will be facilitated. Trends in test performance among Marines, Coast Guard, and Navy applicants can be easily tracked by geographical region and accession source. Likewise, monitoring of minority group performance will be significantly enhanced.

Additional objectives include 1) the identification of opportunities for joint service collaboration in pilot selection, 2) technology transfer opportunities with civilian air carriers, 3) research on the performance characteristics of women and minorities on computer-based tests, and 4) research on the role of personality and motivation in pilot selection. These research opportunities include enhanced cooperation with other Navy medical and warfare laboratories as well as exchange of data between the Navy, Air Force, and Army.

SIGNIFICANT ACCOMPLISHMENTS

The division has already made substantial progress toward the development of a computer software program. A full-time computer programmer has been dedicated to the project. Close working ties have been established with the USA and USAF pilot selection research centers at Fort Rucker and Brooks AFB, respectively. Additional ties have been established with the Naval Aerospace and Operational Medical Institute, Aviation Qualification Division. These relationships will allow the development of the computerized Navy/Marine Corps Aviation Selection Test Battery to meet the high expectations of the fleet user as well as best scientific practice.

During 1993, one technical report and two research papers based on this program were generated. One abstract was also accepted for presentation at the 65th Annual Scientific Meeting of the Aerospace Medical Association.

CALENDAR YEAR 1994 PLANS

Plans call for continued emphasis on the computer software development for the Aviation Selection Test Battery. As the various subtests of the computerized version come on-line, the division will begin trial testing with the system to test validity and reliability against the paper-and-pencil version. The division will continue to address the value of personality and motivation in pilot training prediction.

PROJECTED PRODUCTS AND USERS

Our product will be an IBM-compatible computer program of the Navy/Marine Corps Aviation Selection Test Battery. Projected users of the system include Commander Navy Recruiting Command, Chief of Naval Air Training, Naval Aerospace and Operational Medical Institute, Bureau of Medicine and Surgery, and Chief of Naval Education and Training.



SENSORY SCIENCES DIVISION

Thrust: Enhancement of Aircrew Performance on Auditory- and Vision-related Tasks

Division Head: Carl E. Williams, Supervisory Research Audiologist

Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1965, speech and hearing
science/audiology and psychology

Dr. Williams has been a senior research scientist on psychoacoustics and speech communications for over 26 years. His research interests include psychoacoustics, hearing, speech/voice communication, vocal correlates of emotions/stress, and the test and evaluation of speech communication systems and hearing protective devices. Dr. Williams is Head of the Sensory Sciences Division; the Laboratory Coordinator for Visiting Scientist Programs; the Navy Representative to the National Research Council Committee on Hearing, Bioacoustics, and Biomechanics; a member of the Interagency Coordinating Committee on Deafness and Other Communication Disorders; and a Fellow of the Acoustical Society of America. He has authored/coauthored over 60 scientific papers and reports.



Division Personnel:

Shirley A. Dasho, Secretary (Stenography)

Jerry D. Holsapple, HMI USN, General Duty Corpsman (to Sep)

Paul W. Kerr, Ph.D., Office of Naval Research Postdoctoral Fellow

William K. Krebs, LT MSC USNR, Aerospace Experimental Psychologist

Donald W. Maxwell, B.S., Physicist

G. Daniel Prettyman, M.A., Biologist (from Jun)

Jon F. Sheeley, B.A., Computer Operator (from Oct)

David L. Still, CDR MSC USN, Optometrist

Leonard A. Temme, Ph.D., Research Physiologist

Gerald B. Thomas, Ph.D., Research Psychologist

Paul R. Van Dyke, Psychologist (temporary)

Anthony W. White, Computer Specialist (temporary)

AIMS AND OBJECTIVES

Division research efforts include the development of methods, devices, and training procedures to enhance aircrew performance on auditory- and vision-related tasks. Division staff also devise clinical procedures to evaluate sensory system function based on performance requirements of critical aviation operations. Test and evaluation of sound-attenuation devices, visual detection systems, and eye-protection equipment account for much of the division's work. Additionally, test-battery support and subject screening are provided to other laboratory projects. Vision and auditory performance data are collected on aviators to determine the sensory characteristics needed for critical task completion. Once identified and validated, these characteristics and the laboratory-developed, performance-based tests for measuring them will be used as standards for entry into naval aviation. Training procedures are developed to enhance the effectiveness of certain sensory functions.

Sound attenuation and speech intelligibility tests are conducted on hearing protective devices, helmets, and headsets being considered for Navy procurement.

SIGNIFICANT ACCOMPLISHMENTS

A study of aided (NVG) and unaided night vision images of laboratory stimuli and natural scenes showed the NVG images contained significantly less spatial frequency information than the unaided images. Enhancing specific spatial frequency components of a natural scene image in a subsequent study showed some improvement compared to the original image.

An eye-tracking device was installed in a motion-based helicopter simulator at NAS Whiting Field to study the instrument scan patterns of student helicopter pilots.

A commercially available neuronet application program was utilized to discriminate 3 subject groups (Navy jet pilots, Navy helicopter pilots, and college students) on the basis of their performance on 17 vision tests.

Testing of one squadron's ANVIS (Aviator Night Vision Imaging System) devices indicated that while all 53 devices met military specification requirements, several goggles needed repair.

We found that aviators incorrectly adjust their NVG eyepieces by significant amounts, thereby increasing the probability of visual problems. Furthermore, if they use the goggles for an extended period of time, their ocular muscles will become fatigued due to the strain of accommodation, which may lead to headaches and nausea.

A second element of the division's auditory test battery, the dichotic listening test (DLT), was readied for transfer to NAMI. Additional test data were obtained to verify the earlier determined test-retest reliabilities of the Tri-word Modified Rhyme Test (TMRT). At the request of the NAMI ENT Department, we administered the automated TMRT to 95 subjects in NAMI's Repatriated Prisoner of War Study.

Several experimental prototype earcups, designed to enhance hearing protection in high-noise environments, were completed and a new energy-absorbing material was developed. The systematic fabrication and testing of various composite materials resulted in the discovery of a new material capable of attenuating sound better than heavy metal composites, but at a fraction of the weight. A process whereby the sound attenuation characteristics of many existing materials can be improved was formulated. A patent application was filed, and licensing agreements are being negotiated.

Sound attenuation and speech intelligibility test data obtained on a modified active noise reduction (ANR) headset for the Naval Air Warfare Center, Patuxent River, were instrumental in a Navy decision to recommend use of the headset by sonar operators in P3-C aircraft.

A proposed Small Business Innovative Research (SBIR) project, in collaboration with fellow researchers in the Acceleration Division, was accepted for Navy funding/sponsorship in 1994.

CALENDAR YEAR 1994 PLANS

Projected division RDT&E plans for 1994 are shown under the individual project descriptions that follow.

PROJECTED PRODUCTS AND USERS

Projected products and users are shown under the individual project descriptions that follow.

ENHANCED HEARING PROTECTION FOR HIGH-NOISE ENVIRONMENTS

Thrust: Engineering Development of a New Hearing Protection Device

Work Unit Number: 63706N M0933.001-7304 Accession DN243525

Principal Investigator: Gerald B. Thomas, Research Psychologist

Ph.D., University of Florida, Gainesville, FL, 1977,
general experimental psychology (perception and
cognition)/social research methods
See biography, page 58.

Associate Investigators:

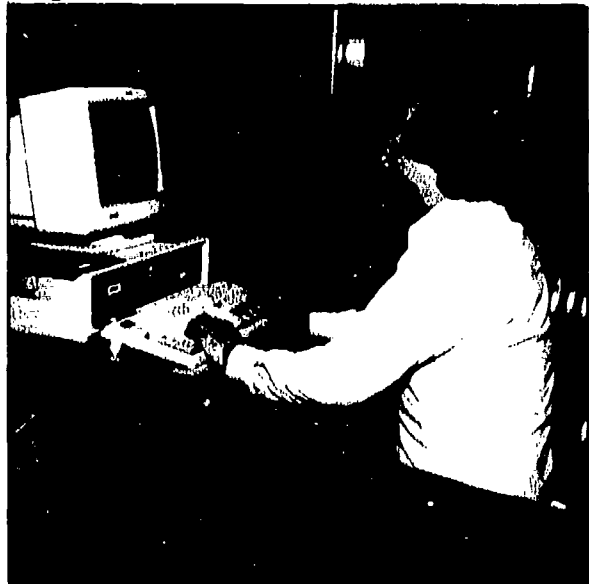
Donald W. Maxwell, B.S., Physicist

Carl E. Williams, Supervisory Research Audiologist

Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1965, speech and hearing
science/audiology and psychology

Work Unit Team:

Arthur R. Nelson, Electronics Technician



AIMS AND OBJECTIVES

The proposed project's general purpose is to conduct the engineering development of a new hearing protection device; its major objective is to deliver a low-cost, noise-attenuating earcup capable of protecting the hearing and improving the auditory performance of personnel operating in very high-noise environments.

The new earcup design centers around the idea of removing the sound-propagating, elastic medium present in the immediate vicinity of the outer ear. Communication and noncommunication versions of the earcup are planned.

SIGNIFICANT ACCOMPLISHMENTS

A unique measuring device to facilitate the development of hearing protective devices was designed and delivered. This device is a multisensor flat plate coupler assembly consisting of the coupler, a calibration earcup, A/D conversion circuitry, and multiple spectral analyses capabilities. It provides a multi-dimensional view of the noise field existing under experimental earcups and thereby expedites earcup component development.

Several prototypes of experimental earcups were completed. Testing of these indicated that an earcup made of a soft metal (e.g., brass alloy) would probably be the most desirable. Further testing on earcup materials continues as warranted.

A new energy-absorbing material was developed. After evaluating currently available materials and finding them unsatisfactory, we systematically fabricated and tested various composite materials. The result of this effort was the discovery of a new material capable of attenuating sound better than heavy metal composites but at a fraction of the weight. Further, we formulated a process whereby the sound-attenuating

characteristics of many existing materials can be improved. A patent application has been filed, and licensing agreements are being negotiated.

CALENDAR YEAR 1994 PLANS

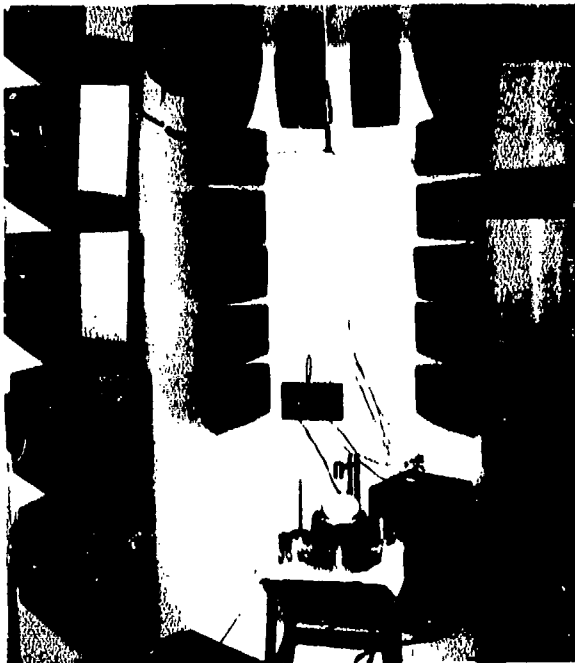
The principal thrust of efforts during CY94 center around new ear seal development. Ear-seal prototypes are presently in the design stage and will be fabricated and tested during the first half of CY94. In addition, contracts will be let for the manufacture of earcup assemblies, isolation gaskets, ear seals, and headbands so that evaluation units of the nonaviator version of the earcup will be completed by year's end.

PROJECTED PRODUCTS AND USERS

At least two versions of the earcup will be produced: A noncommunications version and a version permitting the routing of cabling to enable radio- and intercommunications. Delivery of samples of the noncommunications version is slated for late FY94.

End users include aircrew and squadron personnel exposed to high-level noise as well as similarly exposed crew on surface ships, submarines, and landing craft air cushions. Personnel in shipyards and aviation depots, and other shore-based personnel exposed to very high noise, are also slated for earcup usage. Finally, application of the new earcup in private industry is also anticipated. On project completion, a production run in excess of 40,000 units is scheduled.

The discovery of a new energy-attenuating material (and the process underlying it) has applicability beyond the project's stated objective. For example, interest in the material has been expressed by companies that supply components and materials to the automotive and aircraft industries. In addition, the material has obvious potential use in the building materials and heavy equipment fields. Its more immediate use is in the creation of an effective energy isolation gasket and improved ear seal design.



TEST AND EVALUATION OF AUDITORY INSTRUMENTS AND DEVICES

Thrust: Evaluation of Hearing Protective and Speech Communications Equipment (e.g., flight helmets and sound attenuating headsets)

Work Unit Number: Reimbursable Accession DN249511

Principal Investigator: Carl E. Williams, Supervisory Research Audiologist

Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1965, speech and hearing
science/audiology and psychology
See biography, page 52.

Associate Investigators:

Donald W. Maxwell, B.S., Physicist

Gerald B. Thomas, Ph.D., Research Psychologist
Ph.D., University of Florida, Gainesville, FL, 1977,
general experimental psychology (perception and
cognition)/social research methods



AIMS AND OBJECTIVES

The objective of this reimbursable work unit is to obtain test and evaluation data on auditory instruments and devices (e.g., flight helmets, hearing protective devices, sound attenuating headsets) being considered for Navy use. The data are supplied in letter reports to the Navy Systems Command/Activity requesting and funding the testing and evaluation (T&E); the data are utilized by cognizant Navy personnel in making decisions and recommendations concerning the selection and utilization of equipment for specific Navy operational environments.

SIGNIFICANT ACCOMPLISHMENTS

Sound attenuation and speech intelligibility test data obtained on a modified active noise reduction (ANR) headset for the Naval Air Warfare Center, Patuxent River, Maryland, were instrumental in a Navy decision to recommend use of the headset by sensor operators in P3-C aircraft.

A paper comparing the single and double hearing protection afforded by two combinations of hearing protectors was presented at the Annual Scientific Meeting of the Aerospace Medical Association. An exploratory study of the effects of double hearing protection on speech intelligibility in a simulated noise environment was conducted.

Division staff reviewed and recommended changes to the Military Specification for Linear Microphones and the second draft of American National Standard (ANSI) S12.XX-19XX, "Miniature Microphone-in-Real-Ear and Acoustic Test Fixture Methods for the Measurement of Insertion Loss of Hearing Protective Devices." A briefing on the division's noise, hearing, and speech-related RDT&E activities was presented to the Interagency Coordinating Committee on Hearing, Deafness, and Other Communication Disorders. Summaries of the division's noise-related RDT&E were provided to the Armed Services Committee on Biomedical Research Management (ASBREM) and AGARD Working Party 61.

CALENDAR YEAR 1994 PLANS

First-article sound attenuation tests will be conducted on samples of the Navy's new helicopter helmet. Speech intelligibility tests will be conducted on several new types of earphones to obtain data for utilization in the development of a new Navy earphone specification. Division staff will continue to explore possibilities for obtaining block funding to cover tests and evaluations of auditory/speech-related equipment and devices, and fleet-requested consultations in the areas of hearing protection, hearing conservation, voice communications, and speech intelligibility. In the interim, the division will continue to provide requested T&E/consultation services on a reimbursable basis.

PROJECTED PRODUCTS AND USERS

Products are typically laboratory test data for use by Navy Systems commands and activities (e.g., Naval Air Systems Command, Naval Air Warfare Centers, Navy Environmental Health Center) in making recommendations and decisions concerning the selection and utilization of aviation life-support equipment, hearing protective/communications equipment, and new technologies/materials for improving such equipment. The test data are provided in the form of letter reports to the requesting Navy agency/activity and disseminated to scientific and military communities through technical memoranda, publications, and presentations at scientific meetings.



VALIDATION OF BIOMEDICAL STANDARDS AND PERFORMANCE ENHANCEMENT IN NAVY AND MARINE CORPS AVIATION PERSONNEL: AUDITORY

Thrust: Auditory Fitness of Naval Aviators

Work Unit Number: 63706N M0096.001-7006 Accession DN577604

Principal Investigator: **Gerald B. Thomas**, Research Psychologist

Ph.D., University of Florida, Gainesville, FL, 1977,
general experimental psychology (perception and
cognition)/social research methods

Dr. Thomas has been a researcher in the field of human performance for over 20 years and has been engaged in hearing, speech, and psychoacoustics research since the mid-1970s. He has principal responsibility for the design and execution of the research and either actively engages in data collection or supervises assistants. Dr. Thomas is a faculty associate at the University of West Florida.

Associate Investigators:

Donald W. Maxwell, B.S., Physicist

Carl E. Williams, Supervisory Research Audiologist

Ph.D., University of Illinois at Urbana-Champaign,
Urbana, IL, 1965, speech and hearing
science/audiology and psychology



Work Unit Team:

Tatree Nontasak, Ph.D., Personnel Psychologist

Paul Van Dyke, Psychologist (temporary)

Anthony White, Computer Specialist (temporary)

AIMS AND OBJECTIVES

The general purpose of the project is to provide flight surgeons with a more comprehensive and objective method of assessing the auditory fitness of naval aviators. The automated test battery assesses an aviator's speech reception in cockpit noise, auditory short-term memory, auditory reaction time, and auditory attention management.

The specific aim of the present project phase is to validate the previously developed test battery before transferring it to the Naval Aerospace and Operational Medical Institute (NAMI). The validation effort attempts to answer several questions: 1) Is the test battery sufficiently sensitive to differentiate among different populations of aviators and nonaviators? 2) Are scores obtained in a laboratory setting or a flight surgeon's office likely to reflect performance in a (simulated) operational environment? 3) Do highly selected student naval aviators score differentially on the test battery and are their scores correlated with flight school performance?

SIGNIFICANT ACCOMPLISHMENTS

A second element of the test battery, the Dichotic Listening Test (DLT), was readied for transfer to NAMI for their evaluation. A total of 77 volunteer subjects provided data during the validation phase of the DLT in which laboratory-derived results were compared to results obtained under simulated operational environment conditions. We found that a performance correction factor of 6-8% was needed to equate performance in the two experimental venues. This difference was apparently due to the two different response modes (keypad vs. kneeboard) required in the two conditions.

An additional test run of 50 subjects was conducted to verify the earlier determined test-retest reliabilities of the Tri-word Modified Rhyme Test (TMRT), an element of the test battery that measures speech perception in simulated cockpit noise and which is currently under evaluation by NAMI. This subject run concurred with earlier reliability estimates yielding reliabilities in the .7-.9 range (depending on condition).

CALENDAR YEAR 1994 PLANS

Although this project terminated in October of 1993, we plan ongoing interactions with NAMI regarding the TMRT and the DLT and the validation of the final two elements in the auditory fitness test battery--auditory reaction time and auditory short-term memory.

PROJECTED PRODUCTS AND USERS

The ultimate product of this project will be a computer-based auditory test battery capable of assessing auditory fitness from the most peripheral to most central levels. The principal end user will be NAMI, although other services and the Federal Aviation Administration have shown interest.



OPTIMIZING VISUAL PERFORMANCE OF USERS OF ELECTRO-OPTICAL DEVICES

Thrust: Visual Performance Specifications of Electro-optical Devices

Work Unit Number: 63706N M0096.002-7202 Accession DN241515

Principal Investigator: **David L. Still**, CDR MSC USN
Ph.D., Indiana University, Bloomington, IN, 1989,
physiological optics
O.D., Illinois College of Optometry, Chicago, IL,
1977, optometry

CDR Still practiced clinical optometry from 1977 through 1985. His input concerning aspects involving clinical knowledge, visual psychophysics, and optics is particularly valuable. Areas of research interest include night vision goggles, unaided night vision, vision standards, contact lenses, visual acuity, peripheral vision, night myopia, laser eye protection, and visual display of flight instruments. In 1990, LCDR Still submitted the new start proposal that resulted in this work unit.



Work Unit Team:

Jerry D. Holsapple, HMI USN, General Duty
Corpsman (to Jun)

Paul W. Kerr, Ph.D., Office of Naval Research
Postdoctoral Fellow

William K. Krebs, LT MSC USNR, Aerospace Experimental Psychologist

Michael Mittelman, CDR MSC USN, Optometrist, Aerospace Physiologist

G. Daniel Prettyman, M.S., Biologist (from Jun)

Jon F. Sheeley, B.A., Computer Operator (from Oct)

Leonard A. Temme, Ph.D., Research Physiologist

AIMS AND OBJECTIVES

The goals of this research program are to 1) develop visual performance specifications to be incorporated in MILSPECS for current and future generations of electro-optical devices (based on the origins of and solutions to eye fatigue and eye pain experienced with night vision devices (NVD) and operationally important distortions and alterations in perception and visual scan caused by NVD); 2) develop a test battery to be used in testing and evaluating electro-optical devices; 3) provide an inexpensive means for operational units to compare the relative performance of their night vision goggles (NVG), and for individual aviators to operationally preflight their NVG immediately prior to flight; and 4) provide a means to instruct the aviator (at the squadron level deployed ashore or afloat) on the correct adjustment, use, and expected performance of his issued NVG--the same goggles that he will use in flight.

SIGNIFICANT ACCOMPLISHMENTS

Patents. Two patent applications have been submitted by the research team as a result of this study. The first, *Projector Slides for Night Vision Training*, details the special design of the slides utilized in the Aided

and Unaided Night Vision Training Kits. The second patent, *Correction of NVG Depth of Focus for Terrain Board Training*, will correct a major perceptual flaw of NVG terrain with terrain boards by making focus clues of the terrain board match those encountered in real operations.

Field Testing of Goggles. Field tests were conducted on one squadron's ANVIS devices using a Hoffman 126 Night Vision Device test set that measures ANVIS characteristics that are not tested at either the Parachute Rigger shop or Aviation Intermediate Maintenance Department. While overall, the devices passed satisfactorily according to MIL-A-49425, several goggles were in need of repair. A paper describing the study will be presented at the 1994 Annual Scientific Meeting of the Aerospace Medical Association.

Facilities. A Mobile 'NITE' Laboratory has been designed and instrumented for night vision training and demographic data collection of operators in the field.

Providing Training Aids to the Fleet. A technical report detailing present Navy, Army, Air Force, Coast Guard, and Marine Corps training for night vision devices has been prepared.

NVG Training Videos. A study was conducted to investigate the advantages and disadvantages of different NVG filming techniques. From these results, we can develop NVG training tools for the NITE trailer. We have the resources to analyze the effects of illumination, shadows, and terrain, and can determine how such factors influence NVG images captured on video.

Mishap Data Base. Data on NVG-related mishaps in the Navy, Marine Corps, Air Force, Army, and Coast Guard were collected and compiled.

CALENDAR YEAR 1994 PLANS

We will continue to evaluate different parameters of NVD, conducting specific tests to evaluate the theoretical aspects of applying the existing literature to NVD questions. Extensive collaboration is anticipated with other NAMRL projects (e.g., Laser Effects on Visual Search), NAMI, the Naval Air Warfare Center, Patuxent River, Maryland, and the Naval Air Systems Command (PMA-205).

PROJECTED PRODUCTS AND USERS

Aided and Unaided Night Vision Training Kits will be used by Aviation Physiology Training Units and distributed via the Aviation Physiology Model Manager, NAMI. *Night Vision Testing Instrumentation and Standards* will be used at the operational unit level and in a potential aviation vision standard by NAMI. *Night Vision Device Testing* instrumentation will be used at the operational unit level. *Night Vision Device Visual Performance Specifications* will be incorporated in MILSPECs for current and future generations of electro-optical devices.



CONTROLLING NIGHT VISION DEVICE INDUCED VISUAL DISTORTIONS THAT ADVERSELY AFFECT NAVAL OPERATIONS

Thrust: Night Vision Devices (NVDs)

Work Unit Number: 62233N MM33130.009-7305 Accession DN243588

Principal Investigator: David L. Still, CDR MSC USN
Ph.D., Indiana University, Bloomington, IN, 1989,
physiological optics
O.D., Illinois College of Optometry, Chicago, IL,
1977, optometry
See biography, page 60

Work Unit Team:

Jerry D. Holsapple, HMI USN, General Duty
Corpsman (to Jun)

Paul W. Kerr, Ph.D., Office of Naval Research
Postdoctoral Fellow

William K. Krebs, LT MSC USNR, Aerospace
Experimental Psychologist

Michael Mittelman, CDR MSC USN, Optometrist,
Aerospace Physiologist

G. Daniel Prettyman, M.S., Biologist (from Jun)

Jon F. Sheeley, B.A., Computer Operator (from Oct)

Leonard A. Temme, Ph.D., Research Physiologist



AIMS AND OBJECTIVES

Our goal is to determine how night vision devices (NVDs) distort visual performance and to predict how manipulating the NVD images will affect visual performance. With this information, flight safety (procedures) and operational capability (tactics) with the current generation of NVDs can be improved and design decisions can be made to improve future generations of NVDs. The research will allow the development of tactics and construction of local area defenses against NVD equipped attackers/snipers. A sophisticated understanding of NVD functional characteristics will provide both an offensive and defensive competitive edge in the development and implementation of tactics and countermeasures.

SIGNIFICANT ACCOMPLISHMENTS

Laboratory manipulation of night vision goggle images in fourier space showed significant improvements of visual performance in operational scenarios. Consultations with civilian experts in image enhancement and low vision led to the development of an instrumentation capability for conducting real-time fourier transformations of NTSC video signals captured from NVDs. This real-time capability will complement an earlier-devised system that manipulates and constructs images frame by frame. A video tape demonstrating image enhancements was developed. This work has led to active cooperative efforts with the Naval Air Warfare Training Systems Division, Orlando, Florida, to improve night vision goggle images for night vision simulator training.

Operational Images Capture. Fifteen hours of video-captured night vision goggle (NVG) images were filmed in cooperation with the Coast Guard in F/A-18, A-4, and H-60 aircraft.

Application of Low-vision Clinical Techniques. Low-vision patients experience deficits similar to NVGs. Peli & Peli's (1984) enhancement technique that enables low-vision patients improved vision were applied to NVG images. Results showed improved performance with the enhanced NVG images. This study will be presented at ARVO 1994.

NVG Contrast Sensitivity. Measurement of pilots aided contrast sensitivity function under overcast, starlight, quarter moon, and full moonlight conditions when the eyepiece setting was adjusted for each illumination level.

Effect of Blur. We investigated the effects of incorrect adjustments of the ANVIS eyepiece on visual performance. Results showed that aviators incorrectly adjust ANVIS devices by significant amounts, thereby increasing the probability of visual problems. A paper describing the study will be presented at 1994 Annual Scientific Meeting of the Aerospace Medical Association.

CALENDAR YEAR 1994 PLANS

The effect on visual perception with NVGs of specific image distortion and mathematical enhancement will begin. We will expand liaison with university, simulation, and training groups to accelerate our exploration and implementation of mathematical image enhancement.

PROJECTED PRODUCTS AND USERS

'NITF' Training Laboratories will gain scientific basis for NVG utilization. Video training devices will be able to portray NVG images more realistically. The NVG designer who is considering image enhancement will find answers to fundamental parameter issues.



ACQUISITION OF INSTRUMENT SCAN PATTERNS BY NAVY/MARINE STUDENT HELICOPTER PILOTS

Thrust: Teaching Aids for Helicopter Instructor Pilots

Work Unit Number: 63706N M0096.001-7208 Accession DN242632

Principal Investigator: Leonard A. Temme, Research Physiologist
Ph.D., City University of New York, New York City,
NY, 1975, neuropsychology

Dr. Temme has been a vision scientist for more than 15 years. He has held two postdoctoral fellowships, one in the neuroretinal mechanisms of color vision and one addressing the clinical applications of vision psychophysics. Before joining NAMRL, he was on the staff of the Department of Ophthalmology, Kansas Medical School, University of Kansas; the Physiology Department, School of Medicine, State University of New York at Buffalo; and the Department of Ophthalmology, J. Hillis Miller Health Center, University of Florida, Gainesville.

Work Unit Team:

Paul W. Kerr, Ph.D., Office of Naval Research
Postdoctoral Fellow

Jon F. Sheeley, Computer Operator

David L. Still, CDR MSC USN, Optometrist



AIMS AND OBJECTIVES

The objective of the present research is to provide helicopter instructor pilots with an integrated set of teaching aids that facilitate the acquisition of instrument scan patterns by student helicopter pilots who are being trained in the helicopter simulator.

SIGNIFICANT ACCOMPLISHMENTS

An eye-tracking device and associated equipment were installed in a motion-based helicopter training simulator at NAS Whiting Field. The device provides a noninvasive, on-line video record of where a pilot is looking on the instrument panel as he or she "flies" the simulator. This newly developed powerful and useful research platform will enable us to monitor a pilot's eye movements in the context of flight demands and thereby study an important characteristic of pilot competence.

Instrument scan patterns of student helicopter pilots were successfully recorded as the students "flew" the simulator during trial data gathering runs. The simulator state information has been downloaded to an off-board computer for correlation analysis of flight performance and visual scan patterns.

An experimental design has been developed for obtaining eye-scan data on student pilots undergoing training in the motion-based helicopter simulator.

A collaborative research effort was initiated with vision researchers at the Beckman Institute, University of Illinois, who are conducting parallel eye scan research on fixed-wing pilots. A set of experiments were designed to compare simulator data obtained at the University of Illinois with simulator data obtained by NAMRL investigators at Whiting Field.

CALENDAR YEAR 1994 PLANS

Establish standard operating procedures for the major data collection effort involving student naval aviators. Initiate data analysis procedures using a neural network approach. Pursue collaborative efforts with the University of Illinois.

PROJECTED PRODUCTS AND USERS

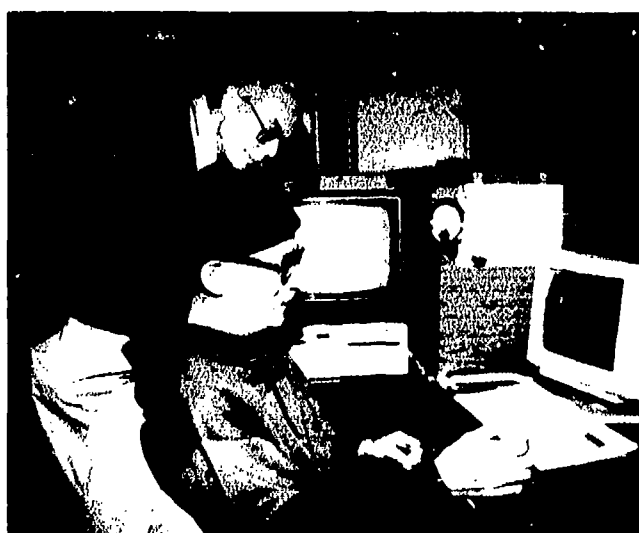
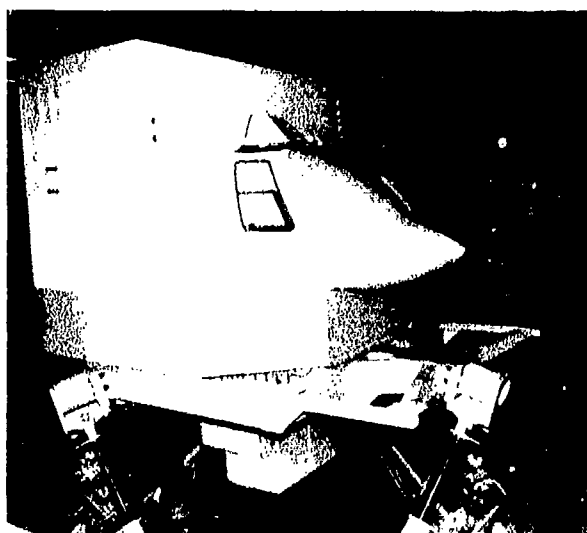
On-line, Real-time Video Display. This product will provide the instructor pilot with an on-line, real-time video display of the student pilot's line of sight superimposed on an on-line, real-time display of the simulator instrument panel as the student "flies" the simulator. With this combined display, the instructor pilot will know precisely where the student pilot is looking and what information is available to the student from the instrument panel. Thus, the instructor will be able to provide accurate and timely feedback.

Video System for Recording Student Scan Patterns. This system will have the capability of video recording the student pilot's line of sight superimposed on the instrument panel. These recordings will be useful to the instructor and student pilots for debriefings, as well as classroom discussion and analysis.

Student Scan Pattern Data Base. In addition to the video recording, scan patterns will be stored on a personal computer in a data base for subsequent study. Instructor pilots, in collaboration with the investigators, will use these recordings and commercially available, off-the-shelf software to analyze the data to specify model or recommended scan patterns.

Selection. Longitudinal studies will be conducted to identify vision tasks and skills of student helicopter pilots most likely to be successful. The differentiation between successful and unsuccessful helicopter students will provide a basis for longitudinally validated vision selection standards, which in turn, should improve the selection of students.

Testing and Training Facility. The present work unit will result in a unique, scientific resource to study instrument scan patterns and the acquisition of skills in motion-based helicopter simulators. This scientific facility will be available for a wide variety of related projects designed to improve aviation performance.



BIOMEDICAL STANDARDS AND PERFORMANCE ENHANCEMENT IN NAVY AND MARINE CORPS AVIATION: VISION

Thrust: Vision Tests for the Selection and Retention of Navy and Marine Corps Aviation Personnel

Work Unit Number: 63706N M0096.001-7052 Accession DN240510

Principal Investigator: Leonard A. Temme, Research Physiologist
Ph.D., City University of New York, New York City,
NY, 1975, neuropsychology.
See biography, page 64.



Work Unit Team:

Paul W. Kerr, Ph.D., Office of Naval Research
Postdoctoral Fellow

David L. Still, CDR MSC USN, Optometrist

AIMS AND OBJECTIVES

The general purpose of the research is to identify tests of vision that are valid, practical tools useful for the selection and retention of naval and Marine Corps aviation personnel. The specific aims of the research are to identify tests of visual skills that 1) discriminate among populations of naval aviators and controls, and 2) are practical for routine administration as selection and screening instruments.

SIGNIFICANT ACCOMPLISHMENTS

Statistical analyses were completed on all of the comparable vision test battery measurements obtained from jet pilots, helicopter pilots and volunteer college students.

A commercially available neuronet application program was utilized to discriminate three subject groups (Navy jet pilots, Navy helo pilots, and college students) on the basis of their performance on 17 vision tests. A paper describing the analysis will be presented at the 1994 Annual Meeting of the Aerospace Medical Association.

Technical capabilities were developed for utilizing an extremely powerful pc-driven vision testing system in support of both vision standards research and studies involving electro-optical night vision devices.

A series of preliminary studies on an operationally useful measure of contact lens wear-induced corneal edema and its effects upon visual acuity were completed.

A summary report was prepared of the research studies conducted under this work unit.

CALENDAR YEAR 1994 PLANS

Although this work unit has been terminated, another vision research project offers a possibility for a continuation of vision standards-relevant research. Specifically, we will use neural networks to analyze the data collected in support of our instrument scan pattern research. We will acquire experience designing and

testing neural networks using the data set that we assembled in support of the vision standards work unit. The advantages of this are: 1) the data set has been well studied and is, therefore, an excellent learning tool; 2) the vision standards data set is much smaller than that to be assembled from the instrument scan pattern research; and 3) the neural networks may reveal relationships in the vision standards data set that have been overlooked by traditional statistical procedures.

PROJECTED PRODUCTS AND USERS

Project terminated.



BIOENGINEERING DIVISION

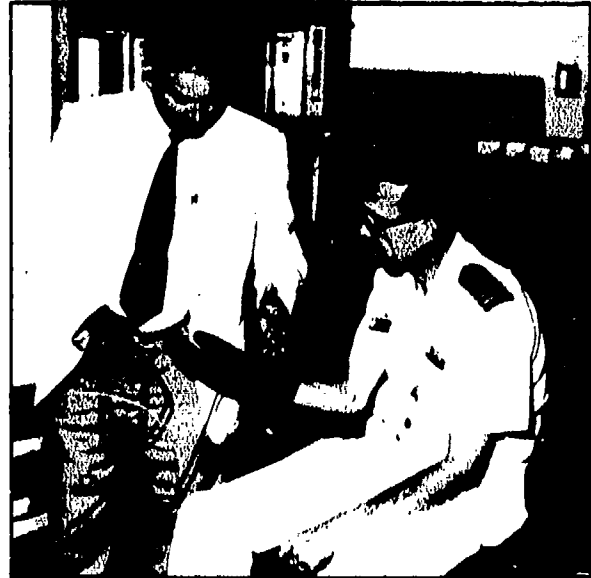
Thrust: Bioelectromagnetic Engineering Research

Division Head: Richard G. Olsen, Supervisory Research Biomedical Engineer
Ph.D., University of Utah, Salt Lake City, UT, 1975,
electrical/biomedical engineering

Dr. Olsen is a leading Navy authority on bioelectromagnetics with more than 15 years experience in radiofrequency (RF) and microwave dosimetry. He has several patents: Resonant Radiofrequency Coil System for Hypothermia Resuscitation, *U.S. Patent Number 4,685,462* (11 Aug 87); Near-field radio wave dosimetry system, *U.S. Patent Number 4,813,789* (21 Mar 89); Electromagnetic Warming of Submerged Extremities, *U.S. Patent Number 5,150,828* (3 Nov 92).

Division Personnel:

John R. Forstall, A.S., Electronics Technician (to Feb)
Toby A. Grisar, B.S., Computer Specialist
Joseph R. Lloyd, B.S., Physical Scientist (to Oct)
Judy C. Thigpen, A.S., Office Automation Clerk
Barry J. Van Matre, B.A.S., Electronics Technician



AIMS AND OBJECTIVES

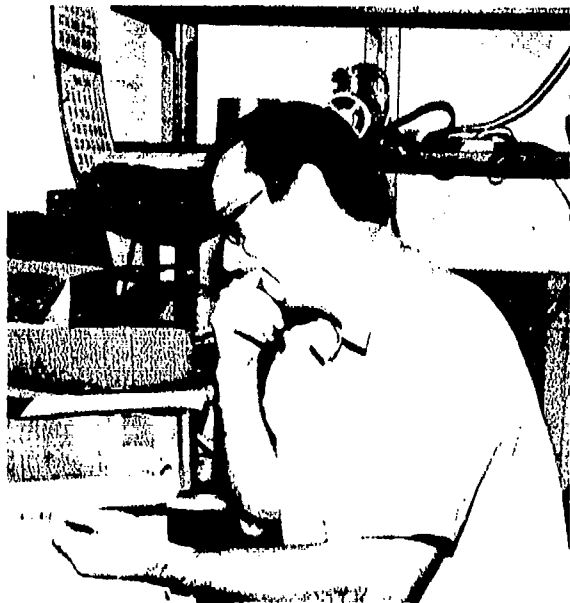
The Bioengineering Division conducts research programs to determine the physiological response of Navy and Marine Corps personnel to specialized operational environments associated with Navy equipment and operating procedures. Division personnel perform engineering research to determine RF radiation absorption in realistic human models and relate the findings to exposure standards. The division also examines the beneficial effect of electromagnetic radiation (EMR) such as the maintenance of extremity warming in cold environs and the treatment of hypothermia.

SIGNIFICANT ACCOMPLISHMENTS

This year was highly productive and eventful for the Bioengineering Division. We published seven technical papers, made seven presentations at national and international conferences, and collected RF energy absorption data on two foreign continents and one Navy ship. Reimbursable funds totaling \$95,000 were obtained from three outside sources including one private distributor of occupational safety equipment. NAMRL-developed RF warming/rewarming devices were demonstrated to NASA personnel and were licensed by a medical equipment manufacture. In addition, two Division inventions were selected for patent prosecution. We demonstrated our RF dosimetry apparatus to officials from the United Kingdom's Ministry of Defense and Germany's Federal Telephone System. The Division's expertise and know-how in RF and microwave dosimetry are known worldwide. The data collected during 1993 were highly significant regarding protection of personnel from potentially harmful RF radiation.

CALENDAR YEAR 1994 PLANS

Lower leg dosimetry research will continue with the selection of the most effective method of thermometry during irradiation and subsequent data collection. Radiofrequency dosimetry will ensue with adapting our recently developed technology to increasing the sensitivity and facility of a dosimeter for individual use. Objectives for this year are expected to be impeded by our anticipated relocation to Brooks Air Force Base.



MANAGEMENT OF RADIOFREQUENCY SHOCK/BURN HAZARDS IN THE NAVY WORKPLACE

Thrust: Protection of Personnel From the Hazards of RF Shock/Burn

Work Unit Number: 63706N M000096.004-7054 Accession DN241516

Division Head: **Richard G. Olsen**, Supervisory Research Biomedical Engineer
Ph.D., University of Utah, Salt Lake City, UT, 1975,
electrical/biomedical engineering
See biography, page 68.

Associate Investigator:

Toby A. Griner, B.S., Computer Specialist

Work Unit Team Member:

Barry J. Van Matre, B.A.S., Electronics Technician

AIMS AND OBJECTIVES

The purpose of this study is to provide the Navy with the means and rationale for the protection of personnel from the hazards of radiofrequency (RF) shock/burn. The major objective is the promulgation of a practical, minimally restrictive RF burn standard along with specifications for apparatus and procedures to test for compliance with that standard.



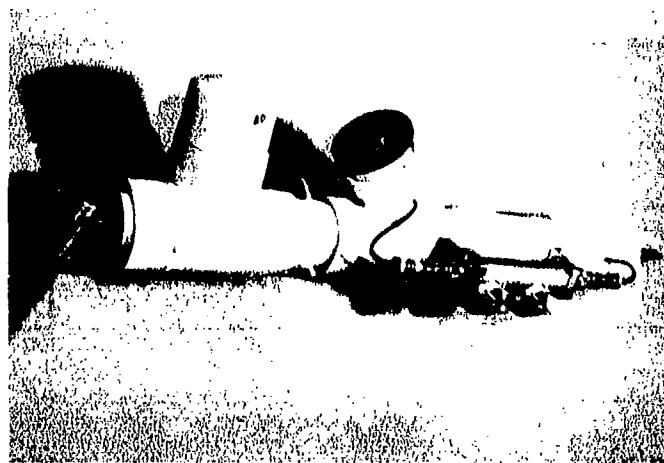
Specific aims of this project will answer the following questions. (1) What measurable irradiation variable or combination of variables correlates with the presence of an RF burn situation? (2) What instruments or devices are best suited for making on-site measurements of the selected variable or variables? (3) What mitigating factors, such as personal protection gear or equipment modification, could be used to reduce the potential for RF shock/burn in a given situation? (4) Lastly, what permissible exposure limit (PEL) regarding RF shock/burn should be adopted by the Navy, considering the factors of personal risk, operational restrictions, and mitigation costs? It is hypothesized that the potential for RF burn can be quantified by a straightforward measurement of a relatively simple irradiation parameter, such as surface charge density, and that similarly simple means of mitigation are available to greatly reduce much of today's risk of RF shock/burn in the Navy.

SIGNIFICANT ACCOMPLISHMENTS

During 1993, we constructed a prototype RF burn detector that incorporated the unique feature of "striking an arc" by repeatedly lifting a needle point off of a sharp metal edge. The handheld detector also contained a directional coupler to assess any net direction of RF current flow. The device can be improved in several ways to make it more practical and portable. A patent application was filed with the Commissioner of Patents and Trademarks to obtain a Navy patent for the use of conductive garments to protect workers from RF burns. This project was successfully completed on 30 September 1993.

PROJECTED PRODUCTS AND USERS

The end product is a Navy permissible exposure limits (PEL) for RF shock and burn. Instruments will assess the severity of RF shock- and-burn sites without risk to the operator making the measurement. To reduce the potential for RF shock and burn, we will develop personal gear or equipment modifications to further mitigate shock-and-burn hazards. These products are being developed for Navy use aboard ships near communications antennas and heat sealers, and at shore-based very low frequency stations.



RADIOFREQUENCY DOSIMETRY IN THE NAVY WORKPLACE

Thrust: Improved Means of Dose Determination for Nonionizing Radiation

Work Unit Number: 63706N M0096.004-7011 Accession DN248546

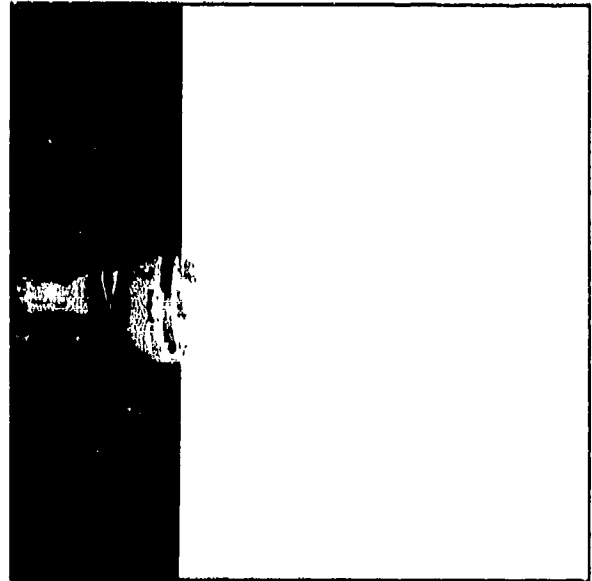
Principal Investigator: **Richard G. Olsen**, Supervisory Research Biomedical Engineer
Ph.D., University of Utah, Salt Lake City, UT, 1975,
electrical/biomedical engineering
See biography, page 68.

Associate Investigators:

John R. Forstall, A.S., Electronics Technician (to Feb)
Barry J. Van Matre, B.A.S., Electronics Technician

AIMS AND OBJECTIVES

This study is a continuing effort to improve means of dose determination for nonionizing radiation in the Navy workplace. Currently, labor-intensive methods are employed to calculate specific absorption rate (SAR) from thermometric, calorimetric, or radiometric measurements. The introduction of SAR criteria into personnel exposure standards placed increased emphasis on knowing what SARs were being produced in the workplace, not just in laboratory experiments. A simple means of SAR measurement is needed, similar to the methods used for the dosimetry of ionizing radiation.



Ear-mounted radar detector

SIGNIFICANT ACCOMPLISHMENTS

The previously developed ear-mounted radar detector was improved and can now detect radar pulses at a distance of 12 miles. A patent application is being drafted for this device. An improved photo-dosimeter was tested aboard USS PERRY (FFG-7) during pulsed irradiation from EMPRESS 1. Increased sensitivity of the photographic detector has provided a 3-to-1 improvement over earlier devices, and the PERRY results demonstrated our ability to photographically record shipboard EMP-induced body-to-ground currents in peak field intensities of less than 1.0 kV/m.

CALENDAR YEAR 1994 PLANS

We will use state-of-the-art technology to further increase the sensitivity of our photo-dosimeter as a practical alternative to laboratory-based thermometric and calorimetric dosimetry methods.

PROJECTED PRODUCTS AND USERS

The use of a detector device capable of providing personnel with a prompt warning of the existence of potentially harmful electromagnetic fields would greatly improve personal radiation hazard safety throughout the Navy.

EVALUATION OF MICROWAVE-PROTECTIVE SUITS

Thrust: Electromagnetic Radiation Protection

Work Unit Number: Reimbursable

Division Head: Richard G. Olsen, Supervisory Research Biomedical Engineer
Ph.D., University of Utah, Salt Lake City, UT, 1975,
electrical/biomedical engineering
See biography, page 68.

Associate Investigator:

Barry J. Van Matre, B.A.S., Electronics Technician

AIMS AND OBJECTIVES

This project evaluates commercially available microwave-protective suits. Test results are used to determine material shielding effectiveness and the power densities at which destructive failure will occur. Results are also used in establishing recommendations for occupational exposure situations around high-power microwave devices and installations. To facilitate evaluation, the NAMRL full-size human model or "green man" is "dressed" in the protective clothing and subjected to various types of high-power radiofrequency (RF) irradiation. Power densities sufficient to thermalize the material are used. Irradiation varies from 2 MHz to 15 GHz continuous wave (CW) and from 1.29 GHz to 5.62 GHz of pulsed. Fiber-optic thermal probes are used to measure heat rise both on the surface of the garment and within the tissue directly beneath the irradiated area.



SIGNIFICANT ACCOMPLISHMENTS

Results thus far indicate that the basic garment consisting of coveralls and hood provide the wearer with significant protection from high-power microwave (1-15 GHz) irradiation. We have also determined that the addition of boots made of this material, when added to the basic ensemble, affords the wearer protection at frequencies as low as 2 MHz. The initial evaluation of this material spawned a Cooperative Research and Development Agreement that led to the significant data obtained at the lower frequencies.

CALENDAR YEAR 1994 PLANS

This 2-year project is complete, and further plans are not required.

PROJECTED PRODUCTS AND USERS

Certain military and industrial occupations require workers to remain near high-power microwave and radiofrequency transmitting antennas for extended periods. Several protective suits have been developed, but few have remained on the market for lack of data to substantiate their effectiveness or safety. These results are of interest to workers who still require this kind of protection and information concerning its reliability.

RADIOFREQUENCY (RF) WARMING/REWARMING TECHNIQUES

Thrust: Effectiveness of Warming Cold Hands and Body with Electromagnetic Energy Using Radiofrequency (RF) Coils

Work Unit Number: 7206 Reimbursable

Division Head: Richard G. Olsen, Supervisory Research Biomedical Engineer
Ph.D., University of Utah, Salt Lake City, UT, 1975,
electrical/biomedical engineering
See biography, page 73.

Associate Investigator:

Joseph R. Lloyd, B.S., Physical Scientist (to Oct)

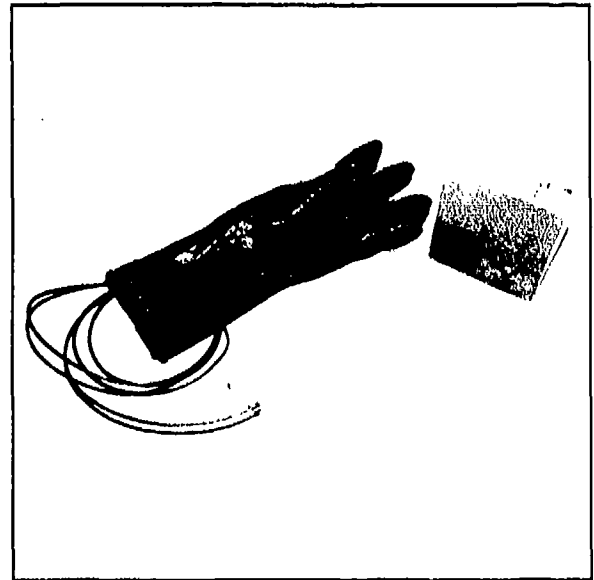
Work Unit Team:

Arthur R. Nelson, Electronics Technician

Barry J. Van Matre, B.A.S., Electronics Technician

AIMS AND OBJECTIVES

This project further explored the potential benefits of adapting radiofrequency (RF) warming technology to Navy shipboard and diving personnel exposed to cold environments. A next-generation RF coil device was planned for development to be incorporated into conventional garments for testing. In the past, RF sources used to feed the coils have been large, heavy systems not suitable as part of a portable, carry-around device. Therefore, this year's objectives included a search of existing technology for miniaturized and highly efficient source amplifiers. Studies were planned using human subjects (approved by the Committee for the Protection of Human Subjects) to determine the effectiveness and efficiency of RF systems to warm extremities. Results from these investigations will, using RF devices first developed here, lead to the use of practical wearing apparel for warming the body and extremities of Navy shipboard and diving personnel with RF energy.



SIGNIFICANT ACCOMPLISHMENTS

An initial wet-test of rubberized RF gloves and high-efficiency RF power sources was successfully conducted at NAMRL. At 7W of power per hand, the RF gloves provided reliable hand warming to a swimmer wearing a standard-stock dry suit. During 1993, both Navy patents related to RF warming technology were licensed by Electronic Health Technology, Inc. (EHTI) for future production of RF coil systems to provide body warmth to those who suffer from diabetes. The company is based near San Antonio, Texas, and has experience in manufacturing and marketing health-related apparatus. A demonstration of our RF gloves was conducted for NASA personnel at the Johnson Space Center in Houston, Texas. The process of Assembling of Space Station Freedom might require active hand warming in the space environment. Radiofrequency coils integrated with the present NASA space suit could provide the needed warmth. Funding for this project ended on 30 September 1993.

PROJECTED PRODUCTS AND USERS

Versions of the RF thoracic-cavity coils and RF gloves could be used for thermal maintenance of Navy shipboard and Special Warfare personnel as well as hypothermia casualties.

RADIOFREQUENCY DOSIMETRY OF THE LOWER-LEG FOR NAVY-RELEVANT EXPOSURE CONFIGURATIONS

Thrust: Impact of Radiofrequency Exposure on Personnel

Work Unit Number: 63706N M0096.004-7401 Accession DN243660

Division Head: **Richard G. Olsen**, Supervisory Research Biomedical Engineer

Ph.D., University of Utah, Salt Lake City, UT,
1975, electrical/biomedical engineering
See biography, page 68.

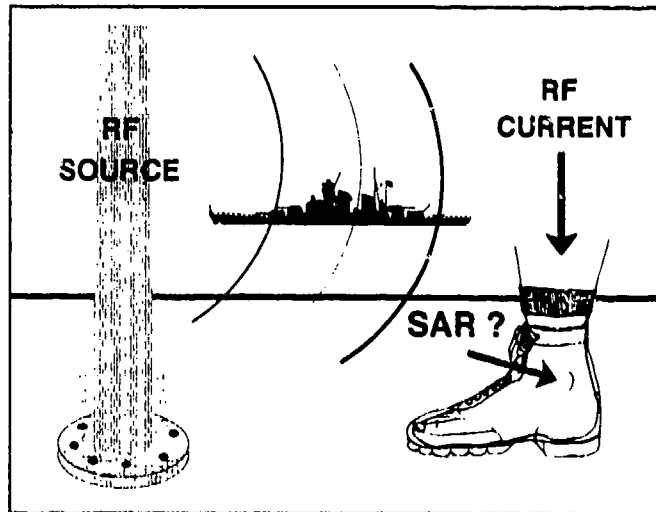
Associate Investigator:

Toby A. Griner, B.S., Computer Specialist

Barry J. Van Matre, B.A.S., Electronics
Technician

AIMS AND OBJECTIVES

The purpose of this study is to determine if newly issued radiofrequency (RF) current standards are consistent with specific absorption rate (SAR) standards and, on the basis of heating, unduly restrictive to Navy exposure situations and operations. Simultaneous measurements of SAR and RF current in live monkeys will provide the relationship needed to assess SAR from RF current measurements and allow easy assessment of Navy localized exposure situations.



SIGNIFICANT ACCOMPLISHMENTS

A low-frequency anechoic chamber has been modified for exposure of rhesus monkeys to measure ankle SAR. The transmitter, transmission line, and antenna used in a previous configuration will be reconfigured and a custom-built waveguide installed to serve as an open-ended waveguide irradiator at 225 MHz. A 1000-W transmitter, signal source, and transmission line will be installed with a bidirectional coupler to monitor power flow. A metal plate has been installed in the chamber to serve as a groundplane. A glass graduate of saline solution was irradiated at a power density of 7.5 mW/cm². Two determinations yielded an average SAR of 4.88 W/kg.

CALENDAR YEAR 1994 PLANS

Specific absorption rate will first be measured in phantom monkeys. Initial thermometric probe implantation experiments in live monkeys and veterinary evaluation of the results will determine the selection of implantation methods to be used. Preliminary restraint trials and ankle SAR measurement will then follow.

PROJECTED PRODUCTS AND USERS

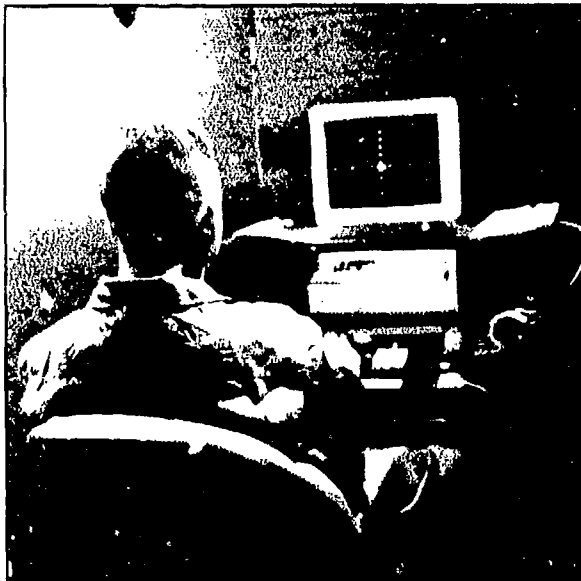
Most likely, our results will establish the Navy's standard for RF current limits and influence future revisions of DoDINST 6055.11. The knowledge gained from the relationship between RF current and SAR may provide a convenient means to assess compliance and reduce risk to personnel.

FACILITIES

The Naval Aerospace Medical Research Laboratory encompasses several unique in-house facilities and capabilities. The facilities include sensory laboratories for conducting vision, auditory, vestibular, acceleration, and spatial disorientation research; laboratories for conducting laser research and studies in aviation selection and sustained operations; environmental chambers for investigations of cold stress and nonionizing radiation; a microwave facility; a biochemistry laboratory; and a laboratory for studying animal models of human behavior. Vision, vestibular, and psychoacoustic mobile field laboratories enable laboratory investigators to collect data in Navy and Marine Corps operational settings, at training bases, and onboard ships.

SENSORY LABORATORIES

One of the Laboratory's principal strengths is its capability for conducting interdependent and interactive RDT&E in the vestibular, vision, and hearing sciences. Because of the complex nature of modern weapon systems, interdisciplinary interactions among researchers in the sensory sciences and related areas provide a unique capability to investigate problems associated with the "total aviator."



The VISION LABORATORY includes a mobile night vision goggle (NVG) training facility ("NITE Lab") that can be used to train NVG users in the field. The "NITE Lab" is equipped with numerous NVG demonstrations and training aids as well as optical testing and vision equipment. The laboratory has facilities for recording, digitizing, and mathematically filtering visual images. In cooperation with the helicopter training facility at Whiting Field (TRAWING FIVE), the laboratory is able to noninvasively record the instrument scan patterns of pilots flying the motion-based, full-scale helicopter instrument trainer.

The PSYCHOACOUSTICS LABORATORY includes acoustical test chambers, a Real-Ear Attenuation Test Facility (ANSI standard compliant), a semi-reverberant test chamber for simulating various Navy operational environments, and a high-level noise test chamber. In addition, equipment supporting analog and digital signal processing, speech analysis, spectral analysis, and radio

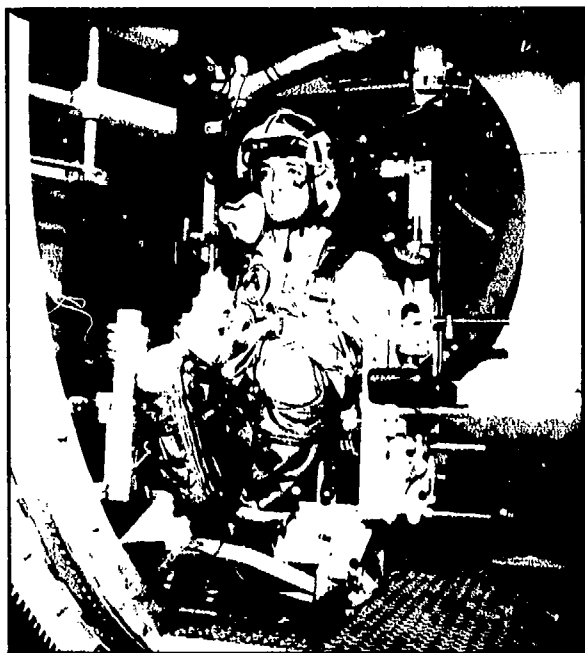
voice communications monitoring is resident. The laboratory also houses unique equipment to design, fabricate, and test innovative hearing protective earcups.

SPATIAL DISORIENTATION LABORATORIES

The SPATIAL DISORIENTATION LABORATORY capability is a unique national asset consisting of a talented team of scientists and many one-of-a-kind research devices. Several of these unique devices are part of the buildings they occupy. Some of these devices are described here:

The CORIOLIS ACCELERATION PLATFORM (CAP) is the only device worldwide capable of applying combined linear and angular acceleration to the human subject. It is also the only device in the DoD inventory available to study chronic exposure to altered G environments. The CAP is a combined linear and angular motion device, which utilizes two independently controlled power servomechanism drive systems to

generate acceleration stimuli originated as a result of rotation about an Earth-vertical axis, and/or rectilinear translation along an Earth-horizontal axis. The device has a 20-ft diameter room, which contains complete life-support and bioinstrumentation equipment for the exposure of 4-8 men to continuous rotation for 30 days or longer. The angular motion drive system is rated to produce velocities to 33 rpm at angular accelerations up to 15 deg/s². The CAP, formerly the Slow Rotating Room, was built by K.D.T. Manufacturing Co. of Roseland, New Jersey, with NASA funds. It was installed in 1965.



The CAP has a linear track that passes through the center of the rotating room (capsule) and permits movement of an encapsulated subject along a rail extending 20 ft on either side of the center of rotation. The Counter Rotator of an additional rotating device that can be secured to the platform of the linear track can be rotated in the same direction or opposite to the direction of rotation of the CAP. It can also remain motionless (that is, not rotating but sliding down the rail) and give the illusion of a sudden change in the direction of rotation as it passes through the center of the rotating room. An environmentally controlled room can also be placed on one end of the rotating arm, and subjects can be tested at varying light levels under varying physiological conditions. Slip rings permit extensive physiological monitoring of the subject during rotation. The contribution of this device to vestibular research has been invaluable since its installation. It has enabled scientists to make accurate simulations of many bizarre combinations of force stimuli and their effects on

aerospace crewmen under carefully controlled conditions. Data gathered by various studies utilizing the CAP continue to contribute significantly to the success of the space program and to the safety and well-being of the astronauts.

The PENDULAR INERTIAL GRAVITATIONAL (PIG) devices (PIG 1A and PIG 1B) are fixed on the linear track at a distance of 20 ft from the center of rotation of the room (one at each end of the linear track) and are used to position a human subject at various angles off from vertical z-axis while the CAP room is rotated. Positioning can be motor-controlled or free-swinging (angle of tilt will be proportional) to speed of rotation. The PIGs can be oriented in four possible different directions.

The Vertifuge or DYNAMIC SIMULATOR (DYNASIM) was installed in 1984 to augment existing NAMRL facilities for research on spatial awareness. This device consists of three main components: A motion system, a visual surround for presentation of Earth-fixed or moving targets, and a computer-controlled system. The motion system is a short-arm centrifuge that provides yaw-axis rotation of an off-center cockpit housed in an aircraft-like fuselage capable of motion about its own pitch-and-roll axes. The computer system presents a variety of displays on two scopes (cathode ray tubes) in the cockpit instrument panel. Currently available scope displays include an Attitude Direction Indicator and five tests of cognitive performance. A functional Malcolm Horizon can also be displayed across the face of the panel. The main axis of the rotary device is centered in a 50-ft diameter white visual surround for presentation of patterns and targets external to the cockpit. Eleven overhead projectors display Earth-fixed or moving scenes and patterns on the visual surround. The chamber wall has been specially prepared for the overhead projection of different visual patterns and scenes viewed by the subject through a clear cockpit canopy, in selected experimental situations. In general, the chamber is kept in complete darkness except during experimental conditions requiring intermittent exposure to the visual stimuli projected on the chamber wall. Five "on-board" projectors can present targets at different angular displacements relative to the subject in the cockpit. Motion characteristics

about pitch-and-roll axes and change in visual displays (cockpit and external target) are under computer control. In the cockpit, the "pilot" can fly by instruments and counteract computer control of the device. The computer provides immediate assessment of "man-in-the-loop" performance. The Vertifuge is currently being used to study pilot disorientation, which has been the direct cause of numerous accidents resulting in loss of life and hundreds of millions of dollars worth of aircraft.

The EQUITEST SYSTEM employs computerized dynamic posturography to systematically examine the effectiveness of visual, vestibular, and somatosensory inputs to balance and the timing, strength, and coordination of postural movements. The system contains a dual forceplate that can rapidly move forward or backward, or tilt and can measure a subject's center of gravity. A visual surround accompanying the system can also tilt. Specially engineered software executes test protocols and analyses and displays test results. During sensory organization tests, the forceplate and visual surround can be either fixed or sway-referenced. During sway-referencing, the subject is exposed to 20-s trials in which the visual or somatosensory input are coupled to the subjects' center of gravity. This allows for evaluation of visual, vestibular, and somatosensory contributions to equilibrium. A series of motor coordination tests include exposure to brief horizontal forward and backward translations of the forceplate. Movement response is measured in terms of symmetry, latency, amplitude scaling, strategy, and adaptation.



The PATE DEVICE was built by Pate Engineering, King City, Ontario, Canada, and was installed at NAMRL in 1962. The device resembles a patient litter and is capable of rotating a subject about the longitudinal body axis and/or the horizontal axis through the pelvis. This apparatus has slip rings, which permit physiological monitoring, and is currently being used to study eye movement in response to rotation or perceived motion generated by moving patterns projected on a hemispheric screen in front of the subject.

The HUMAN DISORIENTATION DEVICE (HDD) is unique in that it is capable of accelerating an instrumented human subject about two head-centered axes simultaneously. Such a tool is indispensable to help differentiate the relative roles played by the various sensory systems involved in the production of disorientation as well as to examine the contribution of each system and subsystem to motion sickness. The HDD is another instrument employed for studying the effects of disorientation caused by rotation and tumbling. The device looks like a large cement mixer and was designed to permit rotation about both an Earth-vertical or Earth-horizontal axis, either singly or in combination, through a speed range of up to 60 rpm. The HDD differs substantially from the Pate device in that the axes of rotation can be made to pass through the intersection of the interaural and naso-occipital lines. The HDD is also unique in that it permits isolation and stimulation of specific portions of the organs of balance in the middle ear. This device, in continuous use since installation in 1960, has provided direct support for many basic and applied research projects sponsored by both the Navy and NASA. Training with this device was responsible for saving the life and mission of one of the early Mercury astronauts who experienced a mechanical malfunction resulting in a violent uncontrolled multiaxial rotation of his space capsule.

The OCULAR COUNTERROLL DEVICE was built by the Naval Air Rework Facility, NAS Pensacola, for NAMRL in the early 1960s. The device was used to measure ocular counterroll in response to total body tilting movement and provide information on possible changes related to aging.

The OFF-VERTICAL-ROTATOR (OVR) is used to gain measures of semicircular canal and otolith function and related spatial orientation performance. This device contains a chair that can rotate a subject under different velocity profiles about an axis ranging from Earth-vertical to 30 deg from vertical, a cylindrical visual surround used to reflect optokinetic stimuli, and a laser projection assembly to calibrate eye motions. The OVR is designed to operate at a constant angular velocity at a preset tilt angle relative to Earth-vertical. The tilt angle is adjustable over a 0-30 deg range. Maximum allowable chair velocity is 50 rpm for tilt angles between 0 and 15 deg, and 30 rpm for tilt angles greater than 15 deg.

The PERIODIC ANGULAR ROTATOR (PAR) is a novel servomotor designed for studies of the dynamic response of the vestibulo-ocular system. The device was delivered to NAMRL in 1964 to meet a requirement for extending the stimulus range during investigations of transient and steady-state responses to sinusoidal angular accelerations of variable magnitude and frequency. The PAR is a high-performance motion-inducing instrument that rotates a seated subject about the Earth-vertical axis in a wide variety of stimulus waveforms.

HUMAN PERFORMANCE LABORATORIES

The AVIATION SELECTION LABORATORY administers test batteries to prospective aviator candidates. Tests include risk-taking estimators, psychomotor skill assessment, dichotic listening tests, and cognitive performance.

The SUSTAINED OPERATIONS LABORATORY is used to study the effects of fatigue, sleep deprivation, and circadian phenomena on the aviation environment. The human-performance testing facility affords an exceptional capability to monitor performance and physiology under controlled conditions for extended periods of time. The facility includes a suite of six human performance test stations, sleeping quarters, galley, break areas, and hygiene facilities located near office spaces. The test stations control acoustic and visual stimulus-display systems used in performance testing and handle the acquisition of behavioral data. The stations are linked, via a high-speed peer-to-peer local area network, to a multiple-subject, physiological data-acquisition system that provides the capability to monitor and record electrocardiographic, electroencephalographic, electrooculographic, body-temperature, and other physiological data during experiments. Real-time links between the data acquisition systems and scientific work stations on the network afford project staff members an extremely high degree of control over the progress of experiments.



ANIMAL MODEL OF HUMAN BEHAVIOR/PHYSIOLOGY AND BIOCHEMISTRY LABORATORY

In our ANIMAL MODEL OF HUMAN BEHAVIOR LABORATORY, we use the rhesus monkey for some studies because of the physiological similarities of the rhesus to man. The monkey model offers particular advantages over human subjects in experimental design. With an animal model, more definitive studies can be done with pharmacological testing, enhancing the understanding of the physiological response beyond that attainable solely through research with human subjects. The number of overall similarities in endocrine physiology suggests that the rhesus monkey is a better model than other large animal models, such as the dog or miniature swine. The monkeys reside in the NAMRL vivarium, which is accredited by the American Association for the Accreditation of Laboratory Animal Care (AAALAC). Our animal model of human

behavior is necessary to the full utilization of other areas of unique research, such as nonionizing radiation effects.

Our BIOCHEMISTRY LABORATORY houses state-of-the-art enzyme and isotopic immunoassays, gas- and high-performance liquid chromatography with microbore capabilities, classic hematology, and automated clinical and research oriented microchemistries. Cell culture, flow cytometry, and fixed-tissue analysis are also available in-house or under agreement with nearby facilities. These resources are utilized for cold-stress research and in support of G_j -tolerance and sustained operations research efforts.

COLD STRESS AND NONIONIZING RADIATION LABORATORIES

We have three ENVIRONMENTAL CHAMBERS, two are in adjacent rooms. One is 8x8 ft, and the other is 10 x 16 ft. The smaller room is used primarily for cold exposure with active temperature control from -5 to 25 C, and the larger room has active temperature control from 0 to 50 C. The third environmental chamber is a free-standing room 8 x 10 ft with precise temperature (0-60 C) and humidity (20-80%) control. Use of the chambers includes work on cold-induced diuresis, nonfreezing cold injury, aviator cooling-vest evaluations, and other temperature/humidity-sensitive research including rewarming of hypothermia victims and evaluation of gloves and boots heated with radiofrequency (RF) energy.



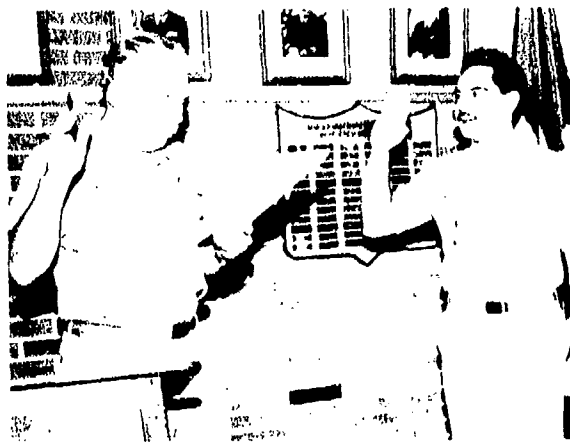
Dominant features of the MICROWAVE FACILITY include three microwave anechoic test chambers, one FPS-26A high-power radar unit (4 MW at 5400-5900 MHz), one FPS-7B high-power radar unit (10 MW at 1250-1350 MHz), and one outdoor irradiation groundplane, which utilizes a 35-ft whip antenna and devices for simulating reradiation structures such as those found aboard Navy ships. The facility also includes the personnel, facilities, and devices for utilization of rhesus monkey subjects. These, along with numerous other devices for RF, microwave, and electromagnetic pulse irradiation, allow us to conduct a wide range of electromagnetic radiation (EMR) studies, which include RF dosimetry, exposure effects of EMR on personnel, and testing of protective devices. Many of these devices are unique to biomedical research and contribute to the development of personnel exposure standards. These research areas are vital to the safety of fleet personnel. The NAMRL microwave facility is the home of the Navy's full-size muscle-equivalent human model ("green man"). The "green man" is portable and can be used aboard Navy ships or in the field where on-site dosimetry is required.

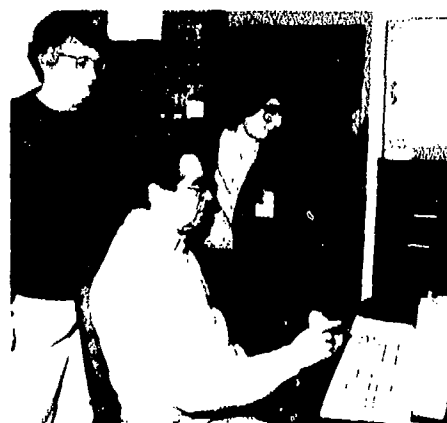
The LASER LABORATORY has two high-powered lasers available (one argon, one multifrequency dye laser). They are used for conducting vision testing using energy levels well below known injury level, to determine effects on aviator performance.

MOBILE FIELD LABORATORIES

This command has developed several MOBILE FIELD LABORATORIES to conduct specialized clinical and research tests evaluating the visual, vestibular, and auditory sensory systems. These tests, by virtue of the trailers mobility, permit our researchers to collect data at training bases, in the operational settings of the Marine Corps, and on board ships.

S U P P O R T





RESEARCH SUPPORT DEPARTMENT

Thrust: Research Support

Department Head: **Don "E" Hackett**, LT MSC USN, Administrative Officer
B.S., New Hampshire College, Manchester, NH, 1984,
business

Division Heads:

Fil J. Arenas, LT MSC USNR, Administrative Support
Division

Don "E" Hackett, LT MSC USN, Comptroller/
Fiscal-Supply Division

Mark D. Marcos, HMC(AW) USN, Operating
Management Division (from Jul)

I. Katherine Vogel, Automated Data Processing
Division



AIMS AND OBJECTIVES

This department supports the Laboratory in matters relating to command organization and general administration functions. The Department also provides for financial management, supply management, facilities maintenance and repair, mail and directory services, security, military and civilian personnel staffing and assignments, and automated data processing support. The Department is composed of four divisions, which provide numerous research support services: Administrative Support, Fiscal-Supply, Operating Management, and Automated Data Processing.

SIGNIFICANT ACCOMPLISHMENTS

The divisions have continued to review all administrative processes in an effort to strive for continuous improvement in all areas of customer support. Their efforts have resulted in development of a customer travel folder to assist personnel during TAD and afterward in the liquidation process. Overall, the department has efficiently processed over 30,000 documents, which included 450 travel orders, 2,292 illustrative work orders, and 1,500 fiscal/supply documents, and developed over 16,000 film negatives. Through innovative tracking and monitoring efforts, the ADP Division was able to successfully program for and replace 35 microcomputers during this calendar year. The command successfully managed and executed programmatic funding in a year of uncertainty and severe shortages without compromising overall customer requirements. The command's obligation rate exceeded 99.9%, and our ability to execute 49.92 man-years out of an authorized 50 man-years was commendable. Our facilities staff continues to aggressively evaluate the facility for improvement projects to guarantee a safe and comfortable working environment for our researchers and administrative staff.

CALENDAR YEAR 1994 PLANS

Provide the necessary administrative support that our internal and external customers require to meet research and higher echelon requirements. We are obligated to continually assess the customer's needs and modify or eliminate various processes to reduce their administrative burden.

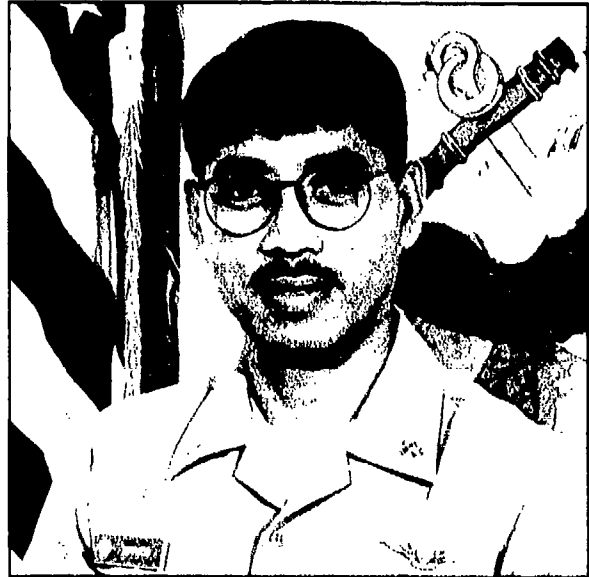
OPERATING MANAGEMENT DIVISION

Thrust: Facilities

Division Head: **Mark D. Marcos**, HMC(AW) USN
Advanced Medical Laboratory Technician (from Jul)

Ervin L. Tate, HMC USN, Independent Duty Corpsman
(to Jul)

HMC(AW) Marcos is an Advanced Medical Laboratory Technician who offers NAMRL 18 years of naval experience. He completed recruit and seaman apprenticeship training in 1975 before reporting to the USS ASHTABULA at Pearl Harbor, Hawaii. He attended Basic Hospital Corpsman "A" School in San Diego, California, in 1977 and later served with Fleet Marine Force at Camp Pendleton and the Amphibious Construction Battalion-One in California. In 1982, he attended Advanced Medical Laboratory Technician School at the Naval School of Health Sciences (NSHS) San Diego and later completed successful tours at the following activities: NAVHOSP Oakland, California; Branch Hospital Adak, Alaska; and NSHS, Bethesda, Maryland. He reported to NAMRL in July 90 where he has worked as Head, Operating Management Division and leading chief petty officer for the Environmental Physiology Division. His awards include Armed Forces Expeditionary Medal, National Defense Medal, and the Good Conduct Medal.



Staff:

Troy D. Brown, HM3 USN, Leading Petty Officer (to Nov)

Marcus T. Jones, HM2 USN, Leading Petty Officer (from Jul)

AIMS AND OBJECTIVES

The Operating Management Division is responsible for coordinating through the Navy Public Works Center the maintenance and repair of the research laboratory, which consists of eight buildings totaling in excess of 119,000 square feet. This division also provides support services that include monitoring security, maintaining command vehicles, ensuring communication requirements, overseeing custodial, grounds, and solid waste contracts, and effecting energy conservation.

SIGNIFICANT ACCOMPLISHMENTS

A local area network using fiber-optic technology was established for building 1811 to provide more efficient and dependable communication services necessary to support research activities.

Coordinated with the local Navy Public Works Center (NPWC) for installation of backflow preventers, waterproofing of bulkheads in the animal holding rooms, and installation of an environmental chamber in our vivarium during FY93. These efforts contributed tremendously toward NAMRL's success during the recent FY94 AAALAC inspection.

A complete asbestos management plan for NAMRL was accomplished via NPWC for implementation in FY94.

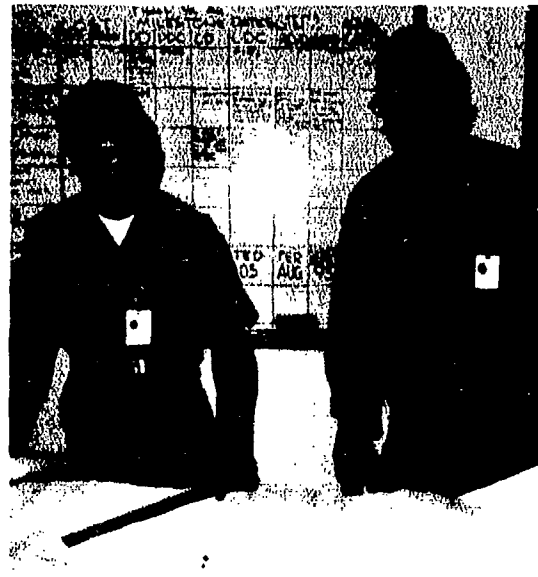
CALENDAR YEAR 1994 PLANS

The architectural and engineering services for special project no. C1-94, to convert building 3229 storage into office spaces, and its modifications will be completed via NPWC in FY94. The completion of special project C1-94 will meet continuing requirements for additional office spaces and staging areas for new accessions and perspective international researchers, and research test equipment.

A metering device for principal steam lines servicing buildings 1953 and 1954 is forthcoming and will soon be installed by NPWC in January 1994. When operational, the metering device will provide NAMRL with an accurate and scientific measurement of steam usage, resulting in substantial savings for the command.

Construction of a mezzanine in room 15, CAP staging area of building 1811, will be a special project-action item for FY94. A mezzanine constructed in the CAP staging area will allow for a secure off-floor area for man-rated devices and free up much needed space for technicians and engineers.

Architectural and engineering services including preparation of cost estimate and step-two submission for special project no. CA1-94, upgrade of Air Handling Units in building 1953, will be completed by NPWC for headquarters review in FY94. Upgrade by replacement of the six remaining air handling units in building 1953 should improve the air quality, decrease costly maintenance requirements, and enhance overall quality of life for personnel working in this facility.



ADMINISTRATIVE SUPPORT DIVISION

Thrust: Correspondence, Military and Civilian Personnel, Travel, and Graphic Arts

Division Head: **Fil J. Arenas**, LT MSC USNR,
M.S., State University of New York, Binghamton, NY,
1987, management science

LT Arenas began his military career in the USAF in December 1976. He was selected by the USN for a direct commission as a Medical Service Corps officer in June 1991. Besides division head, LT Arenas serves as an assistant public affairs officer and a total quality leadership quality advisor. He has accomplished all of his education while on active duty. In addition to his master's degree, he holds a B.S. in human resource management, an A.A.S. in optometric technology, and an A.A.S. in educational technology. He serves as a Health Care Administrator and was selected this year for two additional subspecialties: education and training management as well as patient administration. LT Arenas has two USAF Commendation Medals, a USAF Achievement Medal, two USAF Outstanding Unit Ribbons, four USAF Good Conduct Medals, a National Defense Medal, a USAF Overseas Ribbon, and a USN Pistol Marksman Ribbon with Sharpshooter device.



Staff:

Clarence L. Clark, B.F.A., Illustrator
James R. Cox, Office Automation Clerk
Ronald L. Dean, HMC(SW) USN, Leading Chief Petty Officer (from Sep)
Derrick Epps, HM2 USN, Leading Petty Officer, Travel Coordinator (from Feb)
Glenda G. Gamez, Office Automation Clerk
Diana D. Jones, HM3 USN, Travel Coordinator (to Feb)
Jewell C. Judson, Management Analyst
James B. Paul, Photographer
Thomas W. Tanner, HM3 USN, Office Automation Clerk

AIMS AND OBJECTIVES

This division is responsible for planning, organizing, and administering personnel management programs, and processing all official correspondence for this command. This division also coordinates and plans all command training activities and travel programs, liaisons with the local Human Resources Office and Personnel Support Detachment, and maintains the command's central files. The photographer and illustrator provide all pictorial recordings (still, video, or motion picture format) of procedures and results of laboratory research for publications, presentations, information, and operational purposes. All photographic and graphic art equipment are under the administrative control of the Biomedical Communications Center at the Naval Hospital, Pensacola, Florida, and the personnel assets are under the operational control of NAMRI..

SIGNIFICANT ACCOMPLISHMENTS

This division processed over 30,000 documents, 450 travel orders, and 264 military leaves; provided more than 500 hours of personnel counseling; accomplished 2,292 illustrative work orders; developed 9,048 black/white negatives and 7,548 prints; serialized 1,080 letters; and distributed 1,524 FAXs. In addition, all appointment letters (nearly 1000) and some NAMRL instructions (over 60) were updated. We also upgraded central files, instituted a customer-service training program, completed division crosstraining, implemented a Message Distribution System that expedited message traffic processing nearly 50%, set up a pay clerk system, established a self-help forms section, and instituted an emergency data card system for all personnel. The civilian personnel section provided counseling, processed 30 training requests and 25 requests for personnel action, and received and processed 78 pieces of classified material.

CALENDAR YEAR 1994 PLANS

Our plans for 1994 include automating the travel process, replacing central files with a CD ROM system, implementing more administrative software (Navy Docs, etc), continuing customer-service training, developing a useful customer survey for quality improvement, continuing ADP training, replacing all forms with CD ROM capability, striving toward a "paperless" administration! We will continue to provide the best service possible to our customers through continual improvement of our processes.



FISCAL AND SUPPLY DIVISION

Thrust: Financial and Material Management

Division Head: **Don "E" Hackett**, LT MSC USN, Comptroller/Fiscal-Supply Officer
B.S., New Hampshire College, Manchester, NH,
1984, business

With 22 years in the naval service and 9 years experience in the financial and material management areas, LT Hackett has been a valued member of this command. Upon completion of his B.S. in business in 1984, LT Hackett was commissioned as a Health Care Administrator in the Medical Service Corps. After his initial assignment as assistant comptroller at the Navy's largest teaching hospital in San Diego, California, LT Hackett received an additional 3 months of specialized training in the fiscal/supply discipline at the Naval School of Health Sciences, Bethesda, Maryland. In his next assignment as comptroller of the Naval Dental Clinic, Naples, Italy, the largest geographical Dental Command in the Navy, he was responsible for 10 branch clinics located throughout Europe. His subsequent assignment to NAMRL has enabled him to experience many facets of the medical department, and continue as a key contributor in meeting command goals and milestones. LT Hackett has a Navy Commendation Medal, three Navy Achievement Medals, a Meritorious Unit Commendation Medal, a Navy Unit Commendation Medal, three Good Conduct Medals, two National Defense Medals, and five Overseas Ribbons.



Staff:

Troy D. Brown, HM3 USN, Supply Clerk (from Nov)
Wanda E. Chapman, HM2 USN, Supply Clerk (from Nov)
H. Elaine Cotton, Accounting Technician
Julie G. Gandy, Budget Analyst
Gregory V. Robinson, HM3 USN, Supply Clerk
James T. Taber, Assistant Supply Officer/Equipment Specialist
Jimmy W. Visage, HM2 USN, Equipment Manager

AIMS AND OBJECTIVES

The Fiscal Division translates program requirements into the required financial plan and formulates the activity's budget; compares program performance with the financial plan and determines where financial adjustments may be required; directs a progress and statistical reporting system; oversees the coordination of budget, accounting progress reports and statistics, and exercises such internal fiscal review and control as appropriate; and promotes economy and efficiency in the performance of assigned programs. The Supply Division is responsible for requisition and procurement request processing; excess property and surplus disposal; defective, discrepant, and unsatisfactory material reports; cognizant transfers; technical support for requisition management; and interacting with other commands and agencies on supply matters.

SIGNIFICANT ACCOMPLISHMENTS

This division successfully managed and executed command funds in a year of uncertainty and severe shortages without compromising overall customer requirements. We processed over 1,200 equipment and supply requisitions, resulting in a zero loss of operating target funds. The command obligation rate was 99.9%, resulting in execution of \$5,311 million out of an allocated \$5,319 million. Through close monitoring, division head education, and continuous attention to detail, we were able to execute 49.92 man-years out of an authorized 50 man-years. A continual review of internal processes in an effort to improve operations directly resulted in the development of a detailed "Customer Travel Folder" to assist personnel during TAD and the liquidation process.

We have continued to attend multiple total quality workshops and video sessions to improve our financial and material management procedures and processes. Through total quality efforts and improvement, we are striving to attain the elusive "profound knowledge" to enhance overall efficiency in this division.

CALENDAR YEAR 1994 PLANS

We will continue to strive for excellence in the area of customer support. We will seek out and attend customer support seminars to meet our goal of providing the best possible service to our customers. A continual evaluation and review of internal procedures will occur to eliminate unnecessary programs and modify those programs that will enhance the service we provide. Command funds will be managed efficiently and effectively to ensure that maximum obligations are obtained and all customer requirements are met.



AUTOMATED DATA PROCESSING DIVISION

Thrust: Office Automation and Computer Support

Division Head: **I. Katherine Vogel**, Computer Specialist
B.A., Northeastern University, Boston MS, 1966,
physics

Ms. Vogel was a participant in the cooperative education program at Avco-Everett Research Laboratory as a junior scientist while at Northeastern University. She was employed by General Electric as a systems analyst and by Computer Sciences Corporation as a task leader. Ms. Vogel has over 20 years with the Federal Government.

Staff:

Frederick J. Gilliard, DPC USN, Programmer
Arthur R. Nelson, Electronics Technician
Ultra Powe, HM3 USN, ADP Technician

AIMS AND OBJECTIVES

The Automated Data Processing Division is responsible for providing data processing support, which includes monitoring of hardware and software assets associated with the laboratory local area network (LAN) and personal computers, operating and maintaining the LAN, ADP requisitioning, ADP security programs, and assisting with ASDP preparation. The Division also designs, modifies, and troubleshoots menu systems and data base management systems for office automation users, develops training programs, installs new hardware and software, troubleshoots/repairs hardware, and implements programmatic changes.



SIGNIFICANT ACCOMPLISHMENTS

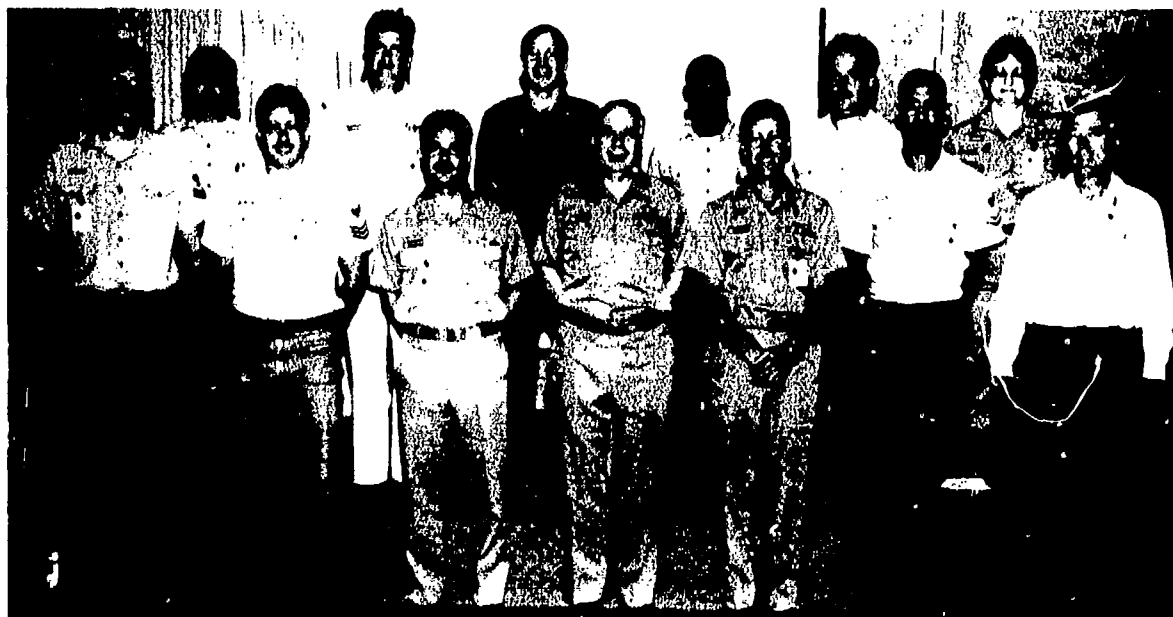
The replacement of 35 older microcomputers was completed this year. Three additional laser printers and seven bubble-jet printers were also distributed to replace failure-prone printers. Additional steps were taken to upgrade the local area network. Programming was started on a common data base for fiscal/supply records.

CALENDAR YEAR 1994 PLANS

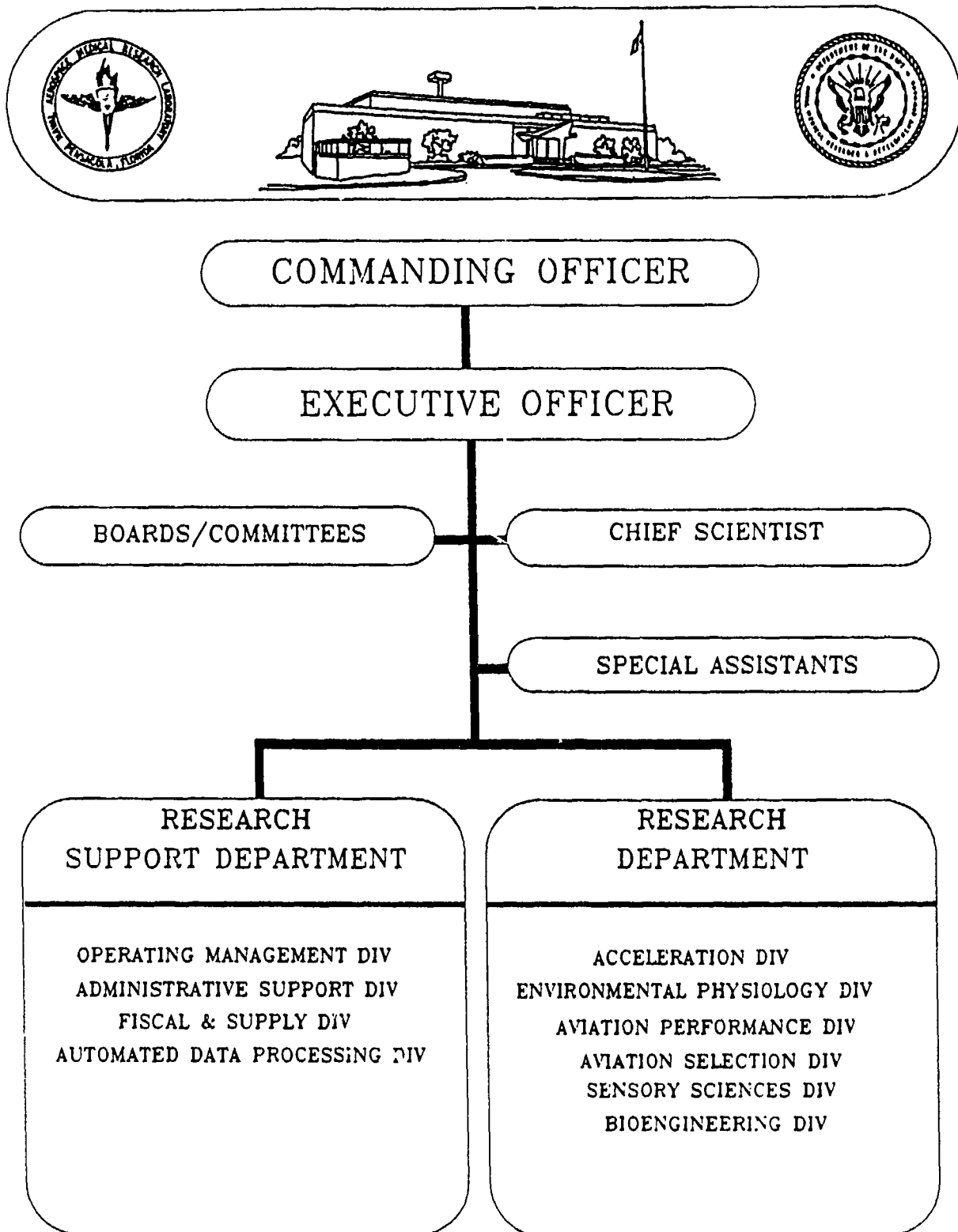
Emphasis this year will be on enhancing users' skills to take full advantage of the capabilities of the in-house software and hardware. Additional programming requests and requirements will be reviewed and addressed as resources permit.

A P P E N D I X E S

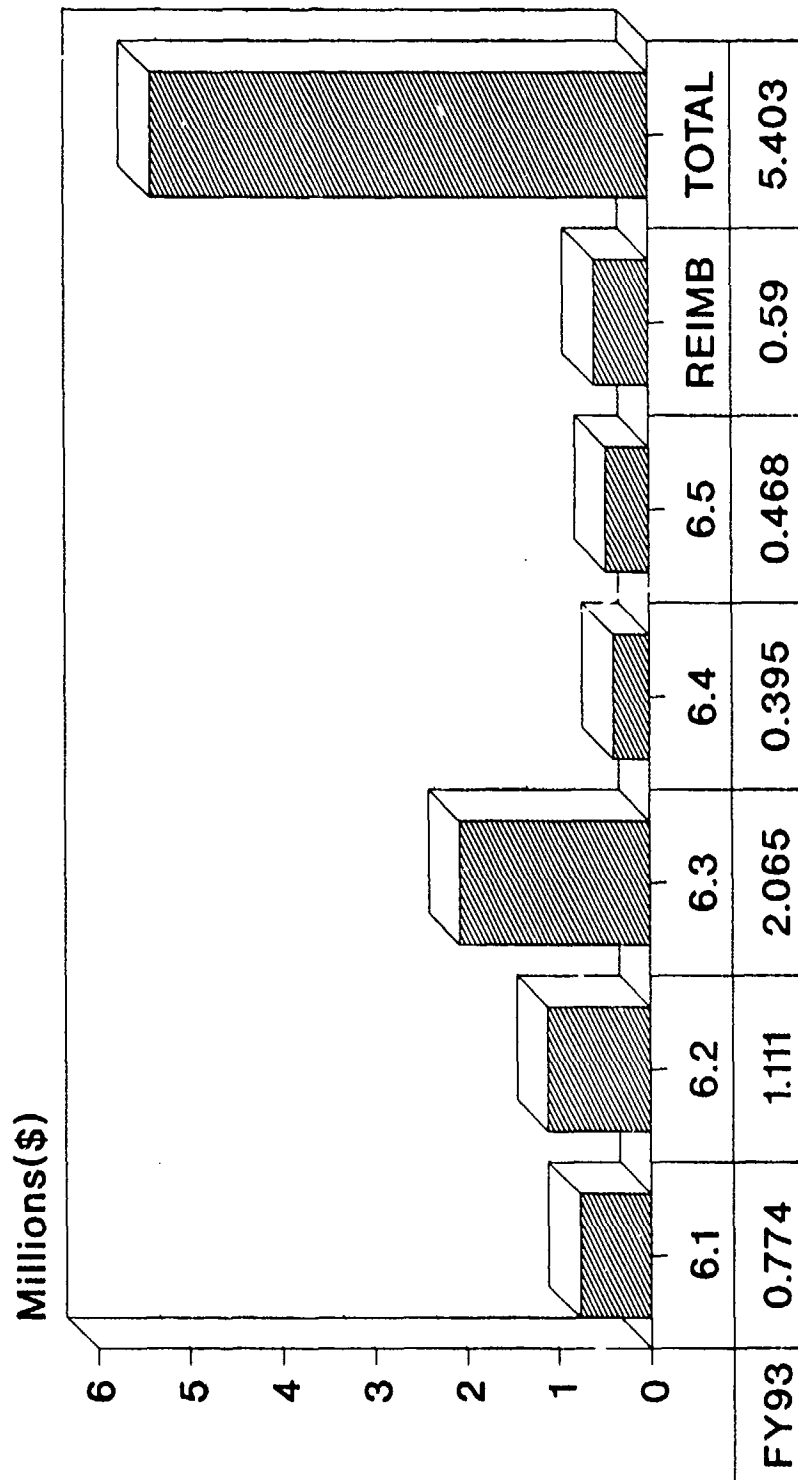
ORGANIZATION	92
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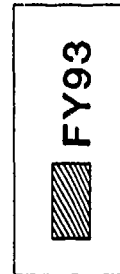
ORGANIZATIONAL CHART



NAVAL AEROSPACE MEDICAL RESEARCH LAB FY93 FUNDING PROFILE



Type Funding



31 December 1993

SAILOR OF THE QUARTER/YEAR AWARDS



SAILOR OF THE YEAR

Barry D. Jacobsen, ET1(SW) USN

"...on his own initiative, he provided expert technical support and dedicated many off duty hours toward the fabrication and modification of the Tactile Interface Vest in the ATD project. The fabrication of this system was instrumental in awarding of thirteen million dollars toward research. Additionally, he implemented a self-help project that saved the command thousands of dollars in maintenance contracts and supply requisitions by fabricating electrical and electronic data cables specifically for research projects."

SAILORS OF THE QUARTER

1st Quarter	Jimmy W. Visage, HM2 USN
2nd Quarter	José M. García, HM1(AW) USN
3rd Quarter	Barry D. Jacobsen, ET1(SW) USN
4th Quarter	Michael D. Hayden, HM1 USN

CIVILIAN OF THE QUARTER/YEAR AWARDS



CIVILIAN OF THE YEAR

G. Dan Prettyman

"...designing and manufacturing accessories for night vision goggles (NVGs) and hardware indispensable for the installation of an eye tracker into the Whiting Field motion-based helicopter simulator... your individual and team accomplishments enabled important research program milestones to be met."

CIVILIANS OF THE QUARTER

1st Quarter	James T. Faber
2nd Quarter	G. Dan Prettyman
3rd Quarter	None
4th Quarter	Phillip K. Wolfe

TOTAL PERSONNEL

(as of 31 Dec 93)

Military

04 Medical Corps
15 Medical Service Corps
01 Marine Corps
20 Hospital Corps
01 Data Processing
01 Electronics Technician
01 U.S. Army Veterinarian Technician

43 Total

Civilian

06 GM (Permanent)
43 GS (Permanent)

50 Total

PROMOTIONS

Military

David G. Still, CDR MSC USN
David F. Neri, LCDR MSC USN
Filomeno J. Arenas, LT MSC USNR
Sheila C. Hecht, LT MSC USNR
Teneal Flowers, HMC(AW) USN
José M. García, HM1(AW) USN
Ultra A. Powe, HM2 USN
Troy D. Brown, HM3 USN

Civilian

Leonard A. Temme, GS-13
Gerald B. Thomas, GS-13
Donald J. Hatcher, GS-11
James B. Paul, GS-9
Philip K. Wolfe, GS-9
Franklyn E. Thrasher, GS-7

LENGTH-OF-SERVICE AWARDS

Robert K. Upchurch	50 Years
Alfred Thomas	35 Years
Carl E. Williams	25 Years
Julie G. Gandy	20 Years
Gerald B. Thomas	15 Years
Joseph R. Lloyd	10 Years
Margaret G. Tracy	10 Years

OUTSTANDING PERFORMANCE AWARDS

Clarence L. Clark
Peter D. Collyer
John A. D'Andrea
Shirley A. Dasho
John O. de Lorge
Constance B. Falbo
Rachel E. Gadolin
JoAnn Ginsberg
Donald J. Hatcher
Janelle S. Key
Tonya D. Lockhart
Donald W. Maxwell

Kathleen S. Mayer
Andrew H. McCardie
Arthur R. Nelson
Richard G. Olsen
G. Dan Prettyman
Robert R. Stanny
Margaret G. Tracy
Robert K. Upchurch
Paul R. VanDyke
Barry J. Van Matre
Carl E. Williams

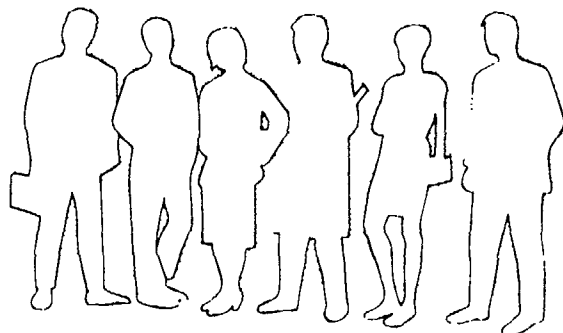
Quality Step Increase

Julie G. Gandy
Anna D. Johnson
Jewell C. Judson
James B. Paul
James T. Taber
Leonard A. Temme
Alfred Thomas
Gerald B. Thomas
Franklyn E. Thrasher

EXTENDED TEMPORARY/ADDITIONAL DUTY

Wade R. Helm, CDR MSC USN,

Naval Aviation Schools Command, Pensacola, FL.



PERSONNEL REPORTING

Military

James C. Baker , CAPT MC USN	Naval Hospital, Oak Harbor, WA
William C. Cohen , HM3 USN	2nd Marine Division, Camp LeJeune, NC
Ronald A. Dean , HMC(SW) USN	DDG 995 SCOTT, Norfolk, VA
Carla L. Doss , SPC USA	167th Medical Detachment, Stuttgart, Germany
Marcus T. Jones , HM2 USN	CV64 CONSTELLATION, San Diego, CA
Michael D. Hayden , HM1 USN	NAMI, Pensacola, FL
P. Michael Holmes , LCDR MSC USN	NAVAIRWARCENWPNDIV, Pt. Mugu, CA
William K. Krebs , LT MSC USNR	NAMI, Pensacola, FL
David L. McKay , LT MSC USNR	NAMI, Pensacola, FL
Andrew M. Mead , LT MSC USNR	NAMI, Pensacola, FL
Michael H. Mittelman , CDR MSC USN	NAMI, Pensacola, FL
Raymond P. Olafson , CAPT MC USNR	NMRU 2, Jakarta, Indonesia Java
William R. O'Neil , Maj USMC	2nd Marine Airwing, Camp LeJeune, NC
Michael D. Reddix , LT MSC USNR	NAMI, Pensacola, FL
Gregory V. Robinson , HM3 USN	2nd Marine Division, Camp LeJeune, NC
Angus A. Rupert , CDR MC USN	NASA Manned Spacecraft Center, Houston, TX
Douglas A. Wiegmann , LT MSC USNR	NAMI, Pensacola, FL

Civilian

Tonya D. Lockhart	Chief Naval Education and Training, Pensacola, FL
Rosalind D. Williams	Pensacola Junior College, Pensacola, FL
JoEllen Wolf	Naval CTS Whiting Field, Milton, FL

PERSONNEL DEPARTING

Military

George W. Atwell , CAPT MC USN	Retired
Donald A. Bergeron , HM2 USN	Honolulu, HI
Troy D. Brown , HM3 USN	Released from active duty
Denise J. Corlies , LT MSC USN	Retired
Daniel L. Dolgin , LCDR MSC USN	NBDE, New Orleans, LA
Jerry L. Holsapple , HM1 USN	Transfer to Fleet Reserve
David F. Neri , LCDR MSC USN	Harvard University
Angus A. Rupert , CDR MC USN	NASA Manned Spacecraft Center, Houston, TX
Dean T. Siniff , Capt MC	3rd Marine Division, Okinawa, Japan
D. Gary Smith , CDR MSC USN	Retired

Civilian

Deborah J. Bachmore	Resigned
Charles A. DeJohn , D.O.	Transfer to Federal Aviation Agency
John R. Forstall	Retired
JoAnn Ginsberg	Transfer to General Services Administration
H. Mike Neisler , III, PhD	Resigned

PERSONNEL RETIRING



George W. Atwell, CDR MC USN

The Commanding Officer, Naval Aerospace Medical Research Laboratory comments on the occasion of your retirement from active duty: I wish to express my whole-hearted appreciation for your outstanding meritorious service while assigned as Special Assistant to the Commanding Officer in aeromedical matters, Naval Aerospace Medical Research Laboratory with additional duty as Head, Special Studies Department, Naval Aerospace Medical Institute, Pensacola, Florida from 11 June 1990 to 01 February 1992.

You have consistently demonstrated exceptional leadership and professionalism in your assignments. Your direction of the Repatriated Prisoner of War Program and the 1000 Aviator Study guaranteed the continuing success of this highly visible program. On your own initiative, you began formulating a plan for the immediate and long-term medical care of Desert Shield/Storm American prisoners of war. This program was a great national and international success. While temporarily assigned as Force Surgeon and medical planner, Commander, U.S. Naval Forces Central Command, you were directly responsible for U.S. Navy medical care for the 18 countries comprising the NAVCENT area of responsibility. You significantly increased the quality, quantity, and responsiveness of medical services in a short time frame.

Your outstanding leadership and performance in a position of significant responsibility reflect great credit on yourself and were in keeping with the highest traditions of the United States Naval Service.

Denise J. Corlies, LT MSC USN

The Secretary of the Navy presents the Navy Commendation Medal for outstanding meritorious service while serving as Head, Research Support Department, Naval Aerospace Medical Research Laboratory from 01 June 1990 to 01 June 1993.

Lieutenant Corlies performed her demanding duties in an exemplary and highly professional manner. Displaying exceptional skill and resourcefulness as an administrator and leader, she led the department to an unprecedented level of material readiness. She displayed superb management ability and fiscal sensitivity in providing oversight for the Administrative Support Department. Additionally, she developed numerous interservice support agreements, Memoranda of Understanding with universities, and initiated Cooperative Research and Development Agreements with various businesses and universities, thus gaining access to state-of-the-art facilities and scientific expertise, which significantly enhanced our scientific productivity at minimum cost to the government.



LT Corlies' perseverance, astute judgement, and inspiring devotion to duty reflect great credit on herself and were in keeping with the highest traditions of the United States Naval Service.



John R. Forstall

In 1961, Mr. Forstall came on board as a Philco Technical Representative Field Engineer in Acoustic Audiology. Seven years later, he started his Civil Service career as a supervisory electronics technician over the Navy-Wide Audiometer Repair and Calibration Program under the Hearing Conservation Division. In that position, Mr. Forstall developed a manikin head with artificial ears for measuring communication fidelity in aircraft, which was reported in two publications.

In 1979, Mr. Forstall's function transferred to the Navy Environmental Health Center, Norfolk, Virginia, resulting in his transfer to the Bioenvironmental Engineering Division of NAMRL. In this position, he worked on the nonionizing radiation research program. He reported results from

associated research projects in four additional scientific publications.

As an electronics technician and associate investigator, Mr. Forstall built and designed many unique prototypes, some of which resulted in patents: an EMP Field Intensity Meter. He currently has a patent application under prosecution for an Ear-Mounted Electromagnetic Energy Detector.

Because of his technical expertise, Mr. Forstall was chosen by the commanding officer to serve as Hearing Conservation Officer for a number of years. He was also chosen to serve as command Safety Manager for 2 years. In the meantime, Mr. Forstall was a member of the laboratory Safety Supervisors' Committee, which he chaired for 2 years. He served on the Safety Policy Committee from 1989-1992 in addition to his other collateral duties.

Besides his professional capabilities, Mr. Forstall's leisure pursuits earned him the reputation as an accomplished musician, talented photographer, amateur writer, and a pretty fair potter. His wit and winning smile were a welcome addition to the laboratory.

Jerry L. Holsapple, HM1 USN

The Secretary of the Navy presents the Navy Achievement Medal for professional achievement in the superior performance of his duties while serving as the Leading Petty Officer for Fiscal/Supply Division from 01 October 1991 to 29 October 1992 and Sensory Sciences Division 30 October 1992 to 30 September 1993 at the Naval Aerospace Medical Research Laboratory, Pensacola, FL.

Petty Officer Holsapple has consistently performed his duties in an exemplary manner. Combining innovative ideas, diverse skills, and organizational abilities, he streamlined procedures, raised productivity, and ensured both divisions not only met but exceeded expectations. He conducted in-depth customer service briefs, which resulted in reducing paper work and requisition error rates by 30%. Utilizing his diverse skills, he organized research work spaces and installed computer work stations and a local area network, which raised productivity within the vision research section by a dramatic 200% and increased personnel 100%. He designed and fabricated prototype accessories for



research instruments, saving his command over \$10,000. His efforts in both divisions have directly resulted in significant savings for the command.

Petty Officer Holsapple's dedication to duty reflected credit upon himself and was in keeping with the highest traditions of the United States Naval Service.

D. Gary Smith, CDR MSC USN

The Secretary of the Navy presents the Navy Commendation Medal (Gold Star in lieu of Third Award) for meritorious service while serving as Head, Environmental Physiology Division, Naval Aerospace Medical Research Laboratory, Pensacola, Florida, from November 1991 to November 1993.

Commander Smith demonstrated selfless initiative, extraordinary versatility, and clear-sighted leadership in meeting and promoting the command's research mission. He flawlessly orchestrated a fleetwide review of aviation life support systems for the Naval Air Systems Command. His tenacious management of this project provided Aviation Life Support System Program Managers with important data for planning and funding Aviation Life Support Systems Development Programs and guaranteed the command's continued role in future crew systems research.

Responding to guidance from the Chief of Naval Personnel, he led a Navy laboratory symposium on the development of occupational physiological testing standards for Navy aircrew. His insightful management and clear-sighted leadership gave the command lead lab responsibilities for new efforts in performance-based testing. A tireless diplomat for his command, he successfully established the command's position as an important and productive research and development resource to all elements of naval aviation. His devotion to duty and inspirational leadership reflected great credit upon himself and were in keeping with the highest traditions of the United States Naval Service.



TEMPORARY DUTY PERSONNEL (MILITARY) DURING 1993

Michael E. Casey, ENS USNR
 David R. Clark, ENS USNR
 Michael W. Diggs, HM1 USN
 James J. Elias, ENS USNR
 Kenneth L. Ferguson, ENS USNR
 Gerry M. Fernandez, Jr., ENS USNR
 James W. Flood, ENS USNR
 Michael A. Gish, ENS USNR
 Joseph B. Green, ENS USNR
 Theodore G. Guetig, ENS USNR
 Daniel J. Haller, ENS USNR
 Gerald T. Heyne, ENS USNR
 Delroy Hire, CAPT MC USN
 Gregory L. Kearns, LCDR USNR
 Peter C. Kempf, AMS2 USN
 James A. Kraus, ENS USNR
 Christopher S. Long, ENS USNR
 Jonathan C. Lovejoy, ENS USNR
 Colin G. McKee, ENS USNR
 Steven A. Morgenfeld, ENS USNR
 Jon L. Nix, ENS USNR
 Gregory A. Ouellette, ENS USNR
 James E. Parker, ENS USNR
 Robert D. Patton, ENS USNR
 Kyle D. Schuman, ENS USNR
 Antonin Z. Sergelin, ENS USNR
 Brian P. Shortal, ENS USNR
 Kevin G. Singleton, ENS USNR
 Kyle W.M. Taylor, ENS USNR
 Jason A. Temple, ENS USNR
 Willem Tielemans, LtCol RCAF
 Edwin C. Tinkle, ENS USNR
 Robert A. Viyra, SH3 USNR
 Johan Westphail, ENS USNR

Training Wing IV
 Grand Rapids, MI
 Pensacola, FL
 U.S. Naval Academy
 U.S. Naval Academy
 San Diego State University
 Shawnee Mission, KS
 Naval Aviation Schools Command
 Naval Aviation Schools Command
 Naval Aviation Schools Command
 U.S. Naval Academy
 U.S. Naval Academy
 Naval Hospital Pensacola
 Arkansas Children's Hospital
 Dexter, MI
 Naval Aviation Schools Command
 U.S. Naval Academy
 Training Wing IV
 San Diego State University
 University of California at San Diego
 Merchant Marine Academy
 Purdue University
 U.S. Naval Academy
 U.S. Naval Academy
 Pennsylvania State University
 Ohio State University
 Dunwoody, GA
 Naval Aviation Schools Command
 U.S. Naval Academy
 Auburn University
 Netherlands
 Purdue University
 Hutchinson, KS
 Naval Aviation Schools Command



TEMPORARY DUTY PERSONNEL (CIVILIAN) DURING 1993

Michael S. Blanchard

Kristin J. Dube

Edward S. Jarmul, Ph.D.

Joseph O. Owasoyo, Ph.D.

Amit L. Patra, Ph.D.

Ferdinand H.J.I. Rameckers

Hidde G. Rameckers

Patricia Rothwell

Avi Shupiak, M.D.

Paul R. Van Dyke

Anthony W. White

GEOCenter, Inc.

University of West Florida

U.S. Navy-ASEE Summer Faculty Research Program;

Red Cross Volunteer

IPA Mobility Assignment

U.S. Navy-ASEE Summer Faculty Research Program

Scientist Engineering Exchange Program

Trainee, Technische Hogeschool, Rijswijk, Netherlands

Red Cross Volunteer

University of Haifa, Israel

University of West Florida

University of West Florida



PRESENTATIONS AND PROFESSIONAL MEETINGS

Arenas, F.J., LT MSC USN, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Baker, J.C., CAPT MC USN, attended Type Commander's Safety Conference, Norfolk, VA, 7-10 Mar 93.

Baker, J.C., CAPT MC USN, attended Tri-service Working Group on Biodynamics, San Antonio, TX, 19-22 Apr 93.

Baker, J.C., CAPT MC USN, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Baker, J.C., CAPT MC USN, attended USAARL Command Presentation, Ft. Rucker, AL, 14 Jul 93.

Baker, J.C., CAPT MC USN, attended Annual Meeting of Experimental Aircraft Association, Oshkosh, WI, 1-6 Aug 93.

Baker, J.C., CAPT MC USN, attended briefing of Tactile Interface to Improve Situational Awareness, Office of Naval Research, 6-7 Sep 93.

Baker, J.C., CAPT MC USN, attended 37th Annual Symposium of Experimental Test Pilots, Los Angeles, CA, 20-26 Sep 93.

Blower, D.J., LCDR MSC USN, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Cross, M.A., HM2 USN, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

D'Andrea, J.A., Ph.D., attended 14th Annual Lasers on the Modern Battlefield Conference, San Antonio, TX, 22-25 Feb 93.

D'Andrea, J.A., Ph.D., attended Navy Issues Surrounding DoD-EMR Safety Standards at a workshop entitled "Developing a New Standardization Agreement for Radiofrequency Radiation," NATO Advisory Group for Aerospace Research and Development (AGARD) Meeting, Rome, Italy, 17-21 May 93.

D'Andrea, J.A., Ph.D., attended 15th Annual Meeting of the Bioelectromagnetics Society, Los Angeles, CA, 13-17 Jun 93.

D'Andrea, J.A., Ph.D., attended New Directions in EMF Research, Kalispell, MT, 6 Aug 93.

D'Andrea, J.A., Ph.D., presented "Laser Glare on Visual Performance in Pilots and Weapon System Operators," Special Counter PGM Read Team Meeting on Bio-effects, Eglin AFB, FL, 23 Sep 93.



de Lorge, J.O., Ph.D., moderated and presented "Extremely Low Frequency Electric and Magnetic Fields as an Emerging Health Issue," 34th Navy Occupational Health and Preventive Medicine Workshop, Virginia Beach, VA, 3 Mar 93.

de Lorge, J.O., Ph.D., served on panel of experts and moderated 1993 EMP Human Health Effects Science Review Panel, and assisted in the assembly and editing of the proceedings, Williamsburg, VA, 16-18 Mar 93.

de Lorge, J.O., Ph.D., hosted Office of Naval Research/NAMRL Electromagnetic Radiation (EMR Joint Investigators Conference, Pensacola, FL, 15-16 Apr 93.

de Lorge, J.O., Ph.D., presented "Navy Issues Surrounding DoD-EMR Safety," Developing a New Standardization Agreement for Radiofrequency Radiation, NATO Advisory Group for Aerospace Research and Development Meeting, Rome, Italy, 17-21 May 93.

de Lorge, J.O., Ph.D., attended Tri-service Electromagnetic Radiation Panel meeting, Washington, DC, 17-20 Jul 93.

de Lorge, J.O., Ph.D., attended New Directions in EMF Research, Kalispell, MT, 6 Aug 93.

de Lorge, J.O., Ph.D., attended Department of Energy Meeting on Extremely Low Frequency, Savannah, GA, 30 Oct-5 Nov 93.

de Lorge, J.O., Ph.D., attended Cellular Telephone Meeting, Washington, DC, 1-3 Dec 93.

Dolgin, D.L., LCDR MSC USN, attended Regional Technology Transfer Meeting, Ft. Rucker, AL, 25-26 Jan 93.

Dolgin, D.L., LCDR MSC USN, attended technology transfer meeting with National Institute of Standards and Technology (NIST) scientific representatives, Boulder, CO, 25-26 Mar 93.

Dolgin, D.L., LCDR MSC USN, attended Federal Laboratory Consortium Technology Transfer Meeting, Pittsburgh, PA, 19-22 Apr 93.

Dolgin, D.L., LCDR MSC USN, hosted meeting of the TAPSTEM Tri-Service Pilot Selection Special Topic Group of the Manpower and Personnel Joint Technology Coordination Group, Pensacola, FL, 26-27 Apr 93.

Dolgin, D.L., LCDR MSC USN, attended 75th NATO Advisory Group for Aerospace Research and Development (AGARD) Aeromedical Panel Meeting and Symposium, Victoria, Canada, 17-21 May 93.

Dolgin, D.L., LCDR MSC USN, attended Technology Transfer Task Force Meeting, Gulf Coast Alliance for Technology Transfer, Eglin AFB, FL, 9 Jun 93.

Dolgin, D.L., LCDR MSC USN, attended workshop on marketing technology transfer, Eglin AFB, FL, 30 Jun 93.

Dolgin, D.L., LCDR MSC USN, attended Federal Laboratory Consortium for Technology Transfer Regional Meeting at Research Triangle Park, Raleigh-Durham, NC, 24-25 Aug 93.

Dolgin, D.L., LCDR MSC USN, attended Gulf Coast Alliance for Technology Transfer, Gainesville, FL, 1-2 Sep 93.

Dolgin, D.L., LCDR MSC USN, attended Psychology Assessment Workshop, Atlanta, GA, 29-30 Sep 93.

Dolgin, D.L., LCDR MSC USN, attended 75th NATO Advisory Group for Aerospace Research and Development Aeromedical Panel Meeting and Symposium, Lisbon, Portugal, 19-23 Oct 93.

Dolgin, D.L., LCDR MSC USN, served as appointed U.S. Navy representative to the Aerospace Medical Association Scientific Program Committee, Alexandria, VA, 1-3 Dec 93.

Griner, T.A., poster presentation "Measurements of RF Current and Localized SAR Near Several Navy Heat Sealers," 34th Navy Occupational Health and Preventive Medicine Workshop, Norfolk, VA, 27 Feb-5 Mar 93.

Griner, T.A., poster presentation "Measurements of RF Current and Localized SAR Near Several Navy Heat Sealers," 15th Annual Meeting of the Bioelectromagnetics Society, Los Angeles, CA, 13-17 Jun 93.

Grissett, J.D., Ph.D., attended briefing for Armed Services Biomedical Research, Evaluation, and Management Committee (ASBREM) meeting, San Diego, CA, 22-25 Feb 93.

Grissett, J.D., Ph.D., briefed "Tactile Interface to Improve Situational Awareness," Office of Naval Research, 6-7 Sep 93.

Grissett, J.D., Ph.D., presented "Mathematical Model for Interaction of Canals and Otoliths in Perception of Orientation, Translation, and Rotation," and "The Push-pull Effect in G Tolerance," 41st International Congress of Aviation and Space Medicine, Hamburg, Germany, 10-17 Sep 93.

Hackett, D."E," LT MSC USN, attended American College of Healthcare Executives Conference (ACHE), Chicago, IL, 28 Feb-3 Mar 93.

Hackett, D."E," LT MSC USN, attended Worldwide DoD Interservice Support Conference, Orlando, FL, 26-30 Apr 93.

Hackett, D."E," LT MSC USN, attended Bureau of Medicine and Surgery Resource Conference, Fair Oaks, VA, 28-29 Nov 93.

Hecht, S.C., LT MSC USN, presented "Radiation Biology," Student Flight Surgeon Class 93002, Naval Aerospace and Operational Medical Institute, Pensacola, FL, 24 Feb 93.

Helton, K.T., attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Helton, K.T., presented "LCAC Program," Aviation Performance-based Testing Workshop, Pensacola, FL, 19-20 Aug 93.

Holmes, P.M., LCDR MSC USN, attended DoD Human Factors Engineering Technical Group Meeting, San Diego, CA, 15-19 Nov 93.

Kerr, P.W., Ph.D., attended 7th International Symposium on Aviation Psychology, Columbus, OH, 25-30 Apr 93.

Kerr, P.W., Ph.D., attended 3rd Meeting of Accelerated Research Initiative, Neural Constraints on Cognitive Architecture, Learning Research and Development Center, University of Pittsburgh, PA, 18-19 Oct 93.

Krebs, W.K., LT MSC USNR, attended Night Operations/Human Factors Workshop, Hurlburt Field, 13-14 Apr 93.

Krebs, W.K., LT MSC USNR, attended Association for Research in Vision and Ophthalmology, Sarasota, FL, 2-7 May 93.

Krebs, W.K., LT MSC USNR, attended USMC 8th Annual Night Vision Conference, New Orleans, LA, 18-20 May 93.



Krebs, W.K., LT MSC USNR, presented "The Modulation Transfer Function (MTF) of Night Vision Goggles (NVG)," 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Krebs, W.K., LT MSC USNR, presented "Current developments in Night Vision Goggles, Photorefractive Keratectomy, and Sunglasses for Aviators," NAS Meridian Advanced Attack Training Wing, NAS Meridian, 1-4 Jun 93.

Krebs, W.K., LT MSC USNR, attended Joint Research on NVDs meetings, University of Louisville, Louisville, KY, 19-20 Jul 93.

Krebs, W.K., LT MSC USNR, attended Joint Research on NVDs meetings, Wright Patterson Air Force Base, Armstrong Medical Research Laboratory, 21 Jul 93.

Krebs, W.K., LT MSC USNR, attended Joint Research on Problems Associated with the Calibration of CATESYES meeting, F/A-18 squadrons at NAS Cecil Field, FL, 2-4 Aug 93.

Krebs, W.K., LT MSC USNR, attended meetings for Joint Research on Problems Associated with the Calibration of CATESYES and ANVIS 6s, Norfolk, VA, 16-19 Aug 93.

Krebs, W.K., LT MSC USNR, attended meetings for Joint Research on NVDs, NAS Patuxent River, MD, 20 Aug 93.

Krebs, W.K., LT MSC USNR, presented "Night Vision Goggle Update: Illusions, Blur, Adjustment, and Other Issues Related to the CATSEYE Tactical Jet Pilot," COMLATWINGONE NVG Safety Conference, NAS Cecil Field, FL, 6-8 Oct 93.

Lawson, B.D., Ph.D., attended 126th Meeting of the Acoustical Society of America, Denver, CO, 2-9 Oct 93.

Lawson, B.D., Ph.D., presented "Attenuating the Disorientation Effects of Head Movement During Whole-body Rotation Using a Visual Reference," Aerospace Medical Panel of AGARD on Virtual Interfaces: Research and Application," Lisbon, Portugal, 19-23 Oct 93.

Lloyd, J.R., presented "Radiofrequency (RF) Warming Gloves With a High-efficiency Power Source for Divers," 15th Annual Meeting of the Bioelectromagnetics Society, Los Angeles, CA, 13-17 Jun 93.

Mateczun, A.J., CAPT MC USN, attended Gulf Coast Alliance for Technology Transfer, Tallahassee, FL, 11 Mar 93.

Mateczun, A.J., CAPT MC USN, attended Association for Research in Vision and Ophthalmology meeting, Sarasota, FL, 2-7 May 93.

Mateczun, A.J., CAPT MC USN, represented U.S. Navy on Aerospace Medical Panel of the NATO Advisory Group for Aerospace Research and Development, Victoria, Canada, 15-22 May 93.

Mateczun, A.J., CAPT MC USN, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Mateczun, A.J., CAPT MC USN, attended Technology Transfer Task Force Meeting, Gulf Coast Alliance for Technology Transfer, Eglin AFB, FL, 30 Jun 93.

Mateczun, A.J., CAPT MC USN, attended briefing of Tactile Interface to Improve Situational Awareness, Office of Naval Research, 6-7 Sep 93.

Mateczun, A.J., CAPT MC USN, attended Surgeon General's Commanding Officer's Meeting, Washington, DC, 3-6 Oct 93.

Mateczun, A.J., CAPT MC USN, attended Naval Medical Research and Development Command 1993 Commanding Officer's Conference, Pensacola, FL, 10-15 Oct 93.



Mayer, K.S., attended 40th Annual Conference of the Society for Technical Communication, Dallas, TX, 6-9 Jun 93.

Mayer, K.S., attended Defense Technical Information Center Annual User's Conference, Crystal City, VA, 1-4 Nov 93.

McKay, D.L., LT MSC USNR, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

McGrath, B.J., attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

McGrath, B.J., presented "Postural Equilibrium Testing of Aviators: Normative Scores using the NAMRL Test Protocol," 5th Annual Symposium, "Diagnostic & Rehabilitative Aspect of Dizziness and Balance Disorders," Denver, Colorado, 93.

Mead, A.M., LT MSC USNR, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Mead, A.M., LT MSC USNR, presented "A Tactile Interface to Prevent Spatial Disorientation," DoD Human Factors Engineering Working Group Meeting, San Diego, CA, 15 Nov 93.

Meyer, L.G., presented "Cold-induced Diuresis," Armed Services Biomedical Research, Evaluation Management Committee meeting, U.S. Army Research Institute for Environmental Medicine, Natick, MA, 25-27 Jan 93.

Meyer, L.G., presented "Cold-induced Diuresis," cold pathophysiology peer review at Naval Medical Research and Development Command, Bethesda, MD, 27-29 Apr 93.

Meyer, L.G., presented "Hydration Fluids and Exercise," AGARD Aerospace Medical Panel Meeting on Extreme Environments, Victoria, BC, Canada, 16-21 May 93.

Meyer, L.G., attended Annual Meeting of the Association of Military Surgeons of the United States, San Antonio, TX, 14-17 Nov 93.

Meyer, L.G., presented "NAMRL's Physiological Testing of Aircrew Cooling Systems," Joint Service Microclimate Cooling Program Review, RD&E Center, Natick, MA, 22-23 Nov 93.

Mittelman, M.H., CDR MSC USN, briefed "Aided and Unaided Night Vision Training Kits," Atlantic Fleet Helicopter Operations School, Pensacola, FL, 20 Jul 93.

Mittelman, M.H., CDR MSC USN, presented "Visual Illusions and Other NVG Topics," Strike-Fighter Wing, U.S. Atlantic Fleet safety standdown for eight squadrons, Cecil Field, FL, 7 Oct 93.

Mittelman, M.H., CDR MSC USN, attended Naval Aviation Training Support Advisory Group, Pensacola, FL, 13-15 Oct 93.

Mittelman, M.H., CDR MSC USN, presented "Contact Lens Use in Aviation and Unaided Night Vision," Triservice Optometry Meeting, Denver, CO, 18-22 Oct 93.

Naval Aerospace Medical Research Laboratory, U.S. Army Aeromedical Research Laboratory, U.S. Army Safety Center and U.S. Navy Safety Center, co-hosted "Spatial Disorientation in Helicopters and its Operational Consequences" Conference, Pensacola, FL, 28-29 Apr 93.

Naval Aerospace Medical Research Laboratory, U.S. Army Aeromedical Research Laboratory, U.S. Army Safety Center, and U.S. Navy Safety Center co-hosted "Long- and Short-term Solutions to Reducing Disorientation Mishaps" Workshop, Pensacola, FL, 30 Apr 93.

Naval Aerospace Medical Research Laboratory hosted the "Aviation Performance-based Testing" Workshop, Pensacola, FL, 19-20 Aug 93.

Naval Aerospace Medical Research Laboratory senior staff attended Command Management Retreat, Mobile, AL, 5-7 Sep 93.

Naval Aerospace Medical Research Laboratory hosted Tri-service Aeromedical Research Panel Fall Technical Meeting, Pensacola, FL, 27 Sep-1 Oct 93.

Naval Aerospace Medical Research Laboratory hosted Naval Medical Research and Development Command's 1993 Commanding Officer's Conference, Pensacola, FL, 10-15 Oct 93.

Neisler, H.M., III, Ph.D., attended Armed Services Biomedical Research, Evaluation Management Committee meeting, U.S. Army Research Institute for Environmental Medicine, Natick, MA, 25-27 Jan 93.

Neisler, H.M., III, Ph.D., presented "Acute Cold Injury," cold pathophysiology peer review, Naval Medical Research and Development Command, Bethesda, MD, 27-29 Apr 93.

Nontasak, T., Ph.D., presented "A Comparison Between Two Hardware Implementations of a Crew Selection System," 30th meeting of DoD Human Factors Engineering Technical Group, Dayton, OH, 11-14 May 93.

Nontasak, T., Ph.D., presented "Development and Implementation of a Landing Craft Air Cushion Vehicle Crew Selection System," 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Nontasak, T., Ph.D., presented "The Right Stuff: Personality Tests and a Five-Factor Model in Landing Craft Air Cushion Crew Training," and "Biographical Attributes and Landing Craft Air Cushion Vehicle Training Outcomes," 37th Annual Meeting of the Human Factors and Ergonomics Society, Seattle, WA, 11-15 Oct 93.

Olsen, R.G., Ph.D., poster presentation "Measurements of RF Current and Localized SAR Near Several Navy Heat Sealers," 34th Navy Occupational Health and Preventive Medicine Workshop, Norfolk, VA, 27 Feb-5 Mar 93.

Olsen, R.G., Ph.D., poster presentation "Measurements of RF Current and Localized SAR Near Several Navy Heat Sealers," 15th Annual Meeting of the Bioelectromagnetics Society, Los Angeles, CA, 13-17 Jun 93.

O'Neil, W.R., Maj USMC, attended Naval Aviation Training Support Advisory Group, Pensacola, FL, 13-15 Oct 93.

Patee, J.C., CAPT MSC USN, attended Type Commander's Safety Conference, Norfolk, VA, 7-10 Mar 93.

Patee, J.C., CAPT MSC USN, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Patee, J.C., CAPT MSC USN, attended Gulf Coast Alliance for Technology Transfer Workshop, Eglin AFB, FL, 30 Jun 93.

Patee, J.C., CAPT MSC USN, attended USAARL Command Presentation, Ft. Rucker, AL, 14 Jul 93.

Patee, J.C., CAPT MSC USN, attended Federal Laboratory Consortium for Technology Transfer Regional Meeting, Research Triangle Park, Raleigh-Durham, NC, 24-25 Aug 93.

Patee, J.C., CAPT MSC USN, attended Gulf Coast Alliance for Technology Transfer, Gainesville, FL, 1-2 Sep 93.

Patee, J.C., CAPT MSC USN, attended Naval Aviation Training Support Advisory Group, Pensacola, 13-15 Oct 93.

Pokorski, T.L., LCDR MSC USN, attended Aircrew Modified Equipment for Ladies in Aviation (AMELIA) Tri-service Long-range Planning Meeting, Naval Air Warfare Center Aircraft Division, Warminster, PA, 10-15 Jan 93.

Pokorski, T.L., LCDR MSC USN, attended Crew Systems Management Team Meeting, Naval Air Systems Command, Washington, DC, 2-4 Mar 93.

Pokorski, T.L., LCDR MSC USN, presented "A Smoking Relapse Prevention Program for Navy Recruits," 108th Annual Convention of the American Alliance for Health, Physical Education, Recreation, and Dance, Washington, DC, 24-28 Mar 93.

Pokorski, T.L., LCDR MSC USN, briefed "NAMRL's Airline Anthropometric Accommodation Assessment," System Engineering Test Directorate, Naval Air Warfare Center, Patuxent River, MD, 27 Apr 93.

Pokorski, T.L., LCDR MSC USN, attended Cooperative Research and Development Agreement Meeting, Atlanta, GA, 17 May 93.

Pokorski, T.L., LCDR MSC USN, attended Naval Aviation Training Support Advisory Group Technology Committee Meeting, Washington, DC, 3-4 Aug 93.

Pokorski, T.L., LCDR MSC USN, presented "Aviation Problem Statement," Aviation Performance-based Testing Workshop, Pensacola, FL, 19-20 Aug 93.



Pokorski, T.L., LCDR MSC USN, presented "Initial Results of Fleet-wide Aviation Life Support Systems Survey," Aircrew Modified Equipment for Ladies in Aviation Program Review, Naval Air Warfare Center Aircraft Division, Warminster, PA, 25-26 Aug 93.

Pokorski, T.L., LCDR MSC USN, attended ergonomic laboratory briefing, Wright Patterson AFB, Dayton, OH, 22-25 Sep 93.

Pokorski, T.L., LCDR MSC USN, presented "Aircrew Modified Equipment for Ladies in Aviation Program Review," Naval Air Systems Command, Washington, DC, 18-19 Oct 93.

Pokorski, T.L., LCDR MSC USN, attended SAFE Conference, Las Vegas, NV, 8-10 Nov 93.

Pokorski, T.L., LCDR MSC USN, presented "Accommodation of Women Naval and Marine Corps Aviators in Naval Aircraft and Protective Clothing/Equipment," 5th Annual Naval Aerospace and Operational Medical Institute Problems Course, Pensacola, FL, 6-10 Dec 93.

Reddix, M.D., LT MSC USNR, presented "Comparison of Progressive Addition Lenses (PALS) and Conventional Bifocals in Presbyopic Aviators," 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Reddix, M.D., LT MSC USNR, presented "Laser Glare on Visual Performance in Pilots and Weapon System Operators," Special Counter PGM Read Team Meeting on Bio-effects, Eglin AFB, FL, 23 Sep 93.

Reddix, M.D., LT MSC USNR, presented "Laser Threats to Naval Aviation," 5th Annual Naval Aerospace and Operational Medical Institute Problems Course, Pensacola, FL, 6-10 Dec 93.

Rupert, A.H., CDR MC USN, briefed "Accelerated Research Initiative, Virtual Reality Displays in Acceleration Environments," NAVAIRSYSCOM, Washington, DC, 3 Mar 93.

Rupert, A.H., CDR MC USN, attended Uniformed Services Health Sciences Meeting, Washington, DC, 5 Mar 93.

Rupert, A.H., CDR MC USN, presented "Spatial Disorientation" and "Motion Sickness" Student Flight Surgeon Class, Naval Aerospace and Operational Medical Institute, Pensacola, FL, 22 and 23 Mar 93 and 30 Nov 93.

Rupert, A.H., CDR MC USN, attended NAMRI/USAARI/USASC/USNSC Spatial Disorientation Conference, Pensacola, FL, 28-30 Apr 93.

Rupert, A.H., CDR MC USN, attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Rupert, A.H., CDR MC USN, briefed "Tactile Interface to Improve Situational Awareness," Office of Naval Research, Washington, DC, 6-7 Sep 93.

Rupert, A.H., CDR MC USN, presented "The Use of a Tactile Interface to Convey Position and Motion Perceptions," Aerospace Medical Panel of AGARD on Virtual Interfaces: Research and Applications, Lisbon, Portugal, 19-23 Oct 93.

Saxton, J.L., attended 3rd International Symposium on Microdialysis and Allied Analytical Techniques, Indianapolis, IN, 18-21 May 93.

Saxton, J.L., attended Annual Meeting of the American Association of Clinical Chemistry, New York, NY, 10-15 Jul 93.

Siniff, D.W., Capt USMC, attended Naval Helicopter Symposium, Jacksonville, FL, 9-12 Mar 93.



Smith, D.G., CDR MSC USN, attended Aircrew Modified Equipment for Ladies in Aviation Tri-service Long-range Planning Meeting, Naval Air Warfare Center Aircraft Division, Warminster, PA, 10-15 Jan 93.

Smith, D.G., CDR MSC USN, presented "NAMRL's Ongoing Research Programs," Human Factors Symposium (Navy/Marine), Type Commanders' Safety Conference, Norfolk, VA, 7-10 Mar 93.

Smith, D.G., CDR MSC USN, presented "Aircrew Modified Equipment for Ladies in Aviation Program," Naval Air Warfare Center Aircraft Division, Warminster, PA, 19-24 Mar 93.

Smith, D.G., CDR MSC USN, attended Cooperative Research and Development Agreement Meeting, Atlanta, GA, 8 Apr 93.

Smith, D.G., CDR MSC USN, attended Cooperative Research and Development Agreement Meeting, Atlanta, GA, 17 Apr 93.

Smith, D.G., CDR MSC USN, attended NAMRL's Airline Anthropometric Accommodation Assessment, Naval Air Warfare Center Aircraft Division, Warminster, PA, 26-27 Apr 93.

Smith, D.G., CDR MSC USN, Naval Aviation Training Support Advisory Group Technology Committee Meeting, Washington, DC, 3-4 Aug 93.

Smith, D.G., CDR MSC USN, attended Initial Results of Fleet-wide Aviation Life Support Systems Survey, Naval Air Warfare Center, Warminster, PA, 25-26 Aug 93.

Smith, D.G., CDR MSC USN, attended Performance-based Testing Workshop, Wright Patterson AFB, Dayton, OH, 22-25 Sep 93.

Smith, D.G., CDR MSC USN, presented "Aircrew Modified Equipment for Ladies in Aviation" Program Review, Naval Air Systems Command, Washington, DC, 18-19 Oct 93.

Stanny, R.R., Ph.D., attended Biophysical Assessment Project Final Program Review, Naval Personnel Research and Development Center, San Diego, CA, 28-29 Jan 93.

Stanny, R.R., Ph.D., attended ONR and Military Stress Study Center of USUHS Grantee and Tri-service Review of 6.1 programs in stress performance, Bethesda, MD, 5-7 Apr 93.

Stanny, R.R., Ph.D., attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Street, D.R., invited speaker, Reserve Components National Security Course, National Defense University, Pensacola, FL, 19 Feb 93.

Street, D.R., presented "Validation of Computer-based Performance Tests (CBPT) for the Selection of Female Naval Aviators," Naval Training Systems Center, Orlando, FL, 23-24 Mar 93.

Street, D.R., presented "Personality Tests in an Enhanced Pilot Selection Model, 7th International Symposium on Aviation Psychology," Columbus, OH, 25-30 Apr 93.

Street, D.R., presented "Effects of Personal Aircrew Cooling on Judgment Speed During High Temperature Exposure," 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Street, D.R., presented "NAMRL Aviation Selection," Performance-based Testing Workshop, Pensacola, FL, 19-20 Aug 93.

Street, D.R., presented "The Future of Naval Aviation Selection: Broad-spectrum Computer-based Testing," 35th Annual Conference of the Military Testing Association, Williamsburg, VA, 15-18 Nov 93.

Temme, L. A., Ph.D., attended 3rd Meeting of Accelerated Research Initiative, Learning Research and Development Center, University of Pittsburgh, PA, 18-19 Oct 93.

Thomas, G.B., Ph.D., attended 6th International Congress on Noise as a Public Health Problem, Nice, France, 3-11 Jul 93.

Van Dyke P.R., attended American Voice Input/Output Society (AVIOS) Meeting, San Jose, CA, 26-30 Sep 93.

Van Matre, B.J., poster presentation "Measurements of RF Current and Localized SAR Near Several Navy Heat Sealers," 34th Navy Occupational Health and Preventive Medicine Workshop, Norfolk, VA, 27 Feb-5 Mar 93.

Van Matre, B.J., poster presentation "Measurements of RF Current and Localized SAR Near Several Navy Heat Sealers," 15th Annual Meeting of the Bioelectromagnetics Society, Los Angeles, CA, 13-17 Jun 93.

Wiegmann, D.A., attended 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Wiegmann, D.A., guest lecturer for Cognitive and Neuroscience Department, Psychology and College of Arts and Social Sciences, University of West Florida, Pensacola, FL, 30 Aug-8 Sep 93.



Williams, C.E., Ph.D., attended Meeting of the Interagency Coordinating Committee on Hearing, Deafness and Other Communication Disorders, Bethesda, MD, 1 Feb 93.

Williams, C.E., Ph.D., participated in Armed Services Biomedical Research, Evaluation and Management Review, Wright Patterson AFB, OH, 23 Mar 93.

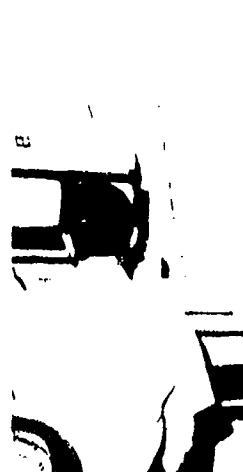
Williams, C.E., Ph.D., presented brief "Mission and Activities of the Sensory Sciences Division," Interagency Coordinating Committee on Hearing, Deafness and Other Communication Disorders, National Institutes of Health, Bethesda, MD, 4 May 93.

Williams, C.E., Ph.D., presented "Comparison of Single and Double Hearing Protection Afforded by Two Combinations of Hearing Protectors," 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

Williams, C.E., Ph.D., attended Meeting of the Interagency Coordinating Committee on Hearing, Deafness and Other Communication Disorders, Bethesda, MD, 27 Jul 93.

Williams, C.E., Ph.D., attended Meeting of the Interagency Coordinating Committee on Hearing, Deafness and Other Communication Disorders, Bethesda, MD, 28 Sep 93.

Williams, C.E., Ph.D., attended 126th Meeting of the Acoustical Society of America, Denver, CO, 2-9 Oct 93.



APPOINTMENTS. HONORS, and AWARDS

Baker, J.C., CAPT MC USN, member *Aeromedical Advisory Council*, Naval Aerospace and Operational Medical Institute, Pensacola.

Chapman, W.E., HM2 USN, *Good Conduct Award*, 2nd award, 5 Feb 93.

Clark, C.L., *On-the-Spot Award* for assistance on the Advanced Technology Demonstration project, 15 Oct 93.

Corlies, D.J., LT MSC USN, *Navy Commendation Medal*, Jun 93.

Cross, M.A., HM2 USN, *Navy Achievement Medal*, 7 Apr 93.

D'Andrea, J.A., Ph.D., member *IEEE Committee on Man and Radiation (COMAR)*.

D'Andrea, J.A., Ph.D., member *COMAR Administrative Committee*.

D'Andrea, J.A., Ph.D., chair *COMAR Pulsed RF Fields Committee*.

D'Andrea, J.A., Ph.D., member *IEEE Standards Coordinating Committee 28 on Nonionizing Radiation*.

D'Andrea, J.A., Ph.D., secretary-treasurer and member *Executive Committee of the Bioelectromagnetics Society*.

D'Andrea, J.A., Ph.D., referee for *Radiation Research*.

Dasho, S.A., *On-the-Spot Award* for assisting in preparing proposals to the Naval Medical Research and Development Command for FY93, 4 May 93.

Dean, R.L., HMC(SW) USN, *COMNAVSURFOR Navy Achievement Medal* for superior performance, Aug 93.

Dean, R.L., HMC(SW) USN, *Good Conduct Award*, 5 Oct 93.

de Lorge, J.O., Ph.D., appointed to *Scientific Program Committee, Aerospace Medical Association*.

de Lorge, J.O., Ph.D., appointed by Governor Chiles to *Governing Board of Northwest Florida Water Management District*.

de Lorge, J.O., Ph.D., member *IEEE Standards Coordinating Committee 28 on Nonionizing Radiation*.

de Lorge, J.O., Ph.D., reviewed article for *Journal of Experimental Psychology*.

de Lorge, J.O., Ph.D., reviewed preproposal for the *National Science Foundation*.

Dolgin, D.L., LCDR MSC USN, consultant to *NATO Working Group on Human Performance at Sea*, Naval Biodynamics Laboratory, New Orleans, LA, 8-10 Mar 93.

Dolgin, D.L., LCDR MSC USN, appointed Task Force Member, *Navy Zero-Based Training and Education Review*.

Dolgin, D.L., LCDR MSC USN, appointed as *Navy representative to the Pilot Selection Special Topic Group of the Manpower and Personnel Joint Technology Coordination Group*.

Dolgin, D.L., appointed to the *Aerospace Medical Association Program Committee* for the 65th Annual Scientific Meeting.

Dolgin, D.L., LCDR MSC USN, selected as *Commander*.

Dolgin, D.L., LCDR MSC USN, representative *Federal Laboratory Consortium and Office of Research and Technology Applications*.

Dolgin, D.L., LCDR MSC USN, *Navy Commendation Medal* for outstanding performance, Sep 93.

Flowers, T., HMC(AW) USN, *Enlisted Aviation Warfare Specialist*, Jan 93.

Flowers, T., HMC(AW) USN, *Navy Achievement Medal* for superior performance, 7 Apr 93.

Gadolin, R.E., *On-the-Spot Award* for assistance on Advanced Technology Demonstration proposal, 15 Oct 93.

Gadolin, R.E., selected '94 *Meeting Planner to Watch in 1994*, by ConventionSouth, 4 Nov 93.

Gandy, J.G., *On-the-Spot Award* for Civilian of the Quarter Award, 9 Aug 93.

García, J.M., HM1(AW) USN, promoted to *HM1*, 16 Mar 93.

García, J.M., HM1(AW) USN, *Florida State Clinical Laboratory Technician*, Tallahassee, FL, 14 May 93.

García, J.M., HM1(AW) USN, *Sailor of the Quarter*, 2nd quarter, and letter of commendation.

García, J.M., HM1(AW) USN, *Enlisted Aviation Warfare Specialist*, 21 Jul 93.

Gilliard, F.J., DPC USN, *Good Conduct Award*, 5th award, 9 Jun 93.

Gilliard, F.J., DPC USN, Command co-chair *Combined Federal Campaign*.

Guedry, F.E., Ph.D., *Executive Council for the Space Medicine*, Aerospace Medical Association.

Hayden, M.D., HM1 USN, Chief, BUMED awarded *Navy Achievement Medal*, 9 Jun 93.

Hayden, M.D., HM1 USN, *Sailor of the Quarter*, 4th quarter, and letter of commendation.

Holsapple, J.L., HM1 USN, *Navy Achievement Medal* for superior performance, 21 Jul 93.

Horrigan, D.J., Jr., CAPT MSC USNR, *Navy Commendation Medal* for "serving as the Health Services Administrative Officer on the staff of Commander, Naval Readiness Command Region TEN, New Orleans, LA," 93.

Jacobsen, B.D., ET1(SW) USN, *Sailor of the Quarter*, 3rd quarter, and letter of commendation.

Jacobsen, B.D., ET1(SW) USN, *Sailor of the Year 1993*, and letter of commendation.

Johnson, A.D., *On-the-Spot Award* for assisting in preparing proposals to the Naval Medical Research and Development Command for FY93, 4 May 93.

Lawson, B.D., Ph.D., grant awarded by *American Society for Engineering Education* ONR Post-doctoral fellowship, 2nd year renewal, Aug 93.

Lovejoy, J.C., ENS USNR, *Navy Achievement Medal* for meritorious service, 9 Jun 93.

Marcos, M.D., HMC(AW) USN, qualified for *Enlisted Aviation Warfare Specialist*, 22 Jun 93.

Mayer, K.S., Command co-chair *Combined Federal Campaign*.

Meyer, L.G., selected for promotion to *Commander*, USNR.

Mittelman, M.H., CDR MSC USN, *Meritorious Service Medal*, 5 Oct 93.

Neisler, H.M., III, Ph.D., *Florida State Laboratory Director*, Tallahassee, FL, 28 Apr 93.

Neisler, H.M., III, Ph.D., *Board Certified Bioanalyst Clinical Laboratory Director*, American Board of Bioanalysis.

Neisler, H.M., III, Ph.D., Associate Editor, *Sports Medicine, Training and Rehabilitation: An International Journal*.

Nelson, A.R., *Suggestion Cash Award*, 22 Mar 93.

Neri, D.F., LCDR MSC USN, *Navy Achievement Medal* for exceptional leadership and unparalleled research productivity, Mar 93.

Nontasak, T., Ph.D., secretary-treasurer, *Personality and Individual Differences in Human Performance Technical Group*, Human Factors Society 1992-1993.

Nontasak, T., Ph.D., served as translator and recorder for the *Multimedia Medical Translator Project of Naval Aerospace and Operational Medical Institute*, Pensacola, FL, Feb-Jun 93.

Olsen, R.G., Ph.D., *Licensing of two U.S. Patents*, 93.

Olsen, R.G., Ph.D., Certificate of Appreciation, Beneficial Suggestion Program, U.S. Navy.

Olsen, R.G., Ph.D., *Who's Who in Industry and Finance*, 28th Edition.

Olsen, R.G., Ph.D., reviewed proposals for Naval Medical Research and Development Command.

Olsen, R.G., Ph.D., referee for *IEEE Transactions on Microwave Theory and Techniques*.

Olsen, R.G., Ph.D., referee for *IEEE Transactions on Biomedical Engineering*.

Olsen, R.G., Ph.D., referee for *Bioelectromagnetics*.

Patee, J.C., CAPT MSC USN, received the *Federal Laboratory Consortium for Technology Transfer Regional Coordinator's Excellence Award*, Research Triangle Park, Raleigh-Durham, NC, 24-25 Aug 93.

Paul, J.C., *On-the-Spot Award* for assistance on the Advanced Technology Demonstration project, 15 Oct 93.

Prettyman, G.D., *Civilian of the Quarter*, 2nd quarter, and letter of commendation.

Prettyman, G.D., *On-the-Spot Award* for Civilian of the Quarter Award.

Prettyman, G.D., *Civilian of the Year 1993*, and letter of commendation.

Prettyman, G.D., *On-the-Spot Award* for Civilian of the Year Award.

Saxton, J.L., *Florida State Clinical Laboratory Technologist*, Tallahassee, FL, 14 Apr 93.

Siniff, D.T., Capt USMC, *Navy Achievement Medal* for superior performance, 4 Jul 93.

Smith, D.G., CDR MSC USN, *Navy Commendation Medal* for superior performance, 30 Nov 93.

Street, D.R., LT MSC USNR, Individual Research Proposal: *Validation of a Computer-based Psychomotor Test (CBPT) for the Selection of Female Naval Aviators*, won in national competition for funding by the Office of Naval Research, 93.

Street, D.R., LT MSC USNR, elected chairperson of the *Personality and Individual Differences in Human Performance Technical Group*, Human Factors and Ergonomics Society, term 1 Jan-31 Dec 93.



DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON DC 20350-1000

19 October 1993

Captain Jerry C. Patee, USN
Executive Officer
Naval Aerospace Medical Research
Laboratory (Code OA)
51 Hovey Road
Pensacola, FL 32508-1046

Dear Captain Patee:

Please accept my personal congratulations on receiving the Federal Laboratory Consortium (FLC) Southeast Regional Coordinator's Excellence Award. Your exceptional efforts in the implementation of Cooperative Research and Development Agreements (CRADAs) at your own laboratory and your leadership in assisting other Federal laboratories in the strengthening of their programs is to be commended.

Under your direction, the Naval Aerospace Medical Research Laboratory (NAVMEDRSLAB) has led the way in increasing involvement by other laboratories in technology transfer activities on a regional and national level. Further, you have promoted the organization and continuance of FLC outreach to user groups that have CRADAs or Memorandums of Understanding with the NAVMEDRSLAB to perform technology transfer. Additionally, you have demonstrated outstanding leadership in support of the Gulf Coast Alliance for Technology Transfer.

Your dedication and accomplishments in the technology transfer arena help to ensure that the Navy will remain in the forefront of shaping the nation's science and technology future. Thank you for a job well done.

Sincerely,

John W. Dalton
Secretary of the Navy

Street, D.R., LT MSC USNR, granted *Secondary Subspecialty Code in Education Training and Management* (0037S), Bureau of Medicine and Surgery (MED 533), 30 Mar 93.

Street, D.R., LT MSC USNR, transferred to the *Regular Navy*, Bureau of Naval Personnel (PERS-4415), May 93.

Street, D.R., LT MSC USNR, Navy representative to the *Joint Service Research and Development in Aircrew Selection and Classification Working Group*, TAPSTEM Joint Technology Coordinating Group.

Street, D.R., LT MSC USNR, completed with honors the *National Security and Decision Making* course, Naval War College, Pensacola, FL, May 93.

Street, D.R., LT MSC USNR, selected for regular Navy, Nov 93.

Taber, J.T., *Civilian of the Quarter*, 1st quarter, and letter of commendation.

Taber, J.T., *On-the-Spot Award* for Civilian of the Quarter Award, 9 Aug 93.

Temme, L.A., Ph.D., *Notable Achievement Award*, 4 Mar 93.

Temme, L.A., Ph.D., *Patent Award*, 26 Apr 93.

Thigpen, J.C., *On-the-Spot Award*, for secretarial support to the commanding officer during absence of secretary, Aug 93.

Thomas, G.B., Ph.D., *Notable Achievement Award*, 4 Mar 93.

Thompson, B.L., SPC USA, certified by American Association for Lab Animal Science for *Lab Animal Technician*.

Thrasher, F.E., certified by American Association for Lab Animal Science for *Lab Animal Technician*.

Thrasher, F.E., *On-the-Spot Award* for saving the life of an ill nonhuman primate, 7 Apr 93.

Tracy, M.G., *On-the-Spot Award* for assisting in preparing proposals to the Naval Medical Research and Development Command for FY93, 4 May 93.

Visage, J.W., HM2 USN, *Sailor of the Quarter*, 1st quarter, and letter of commendation.

Visage, J.W., HM2 USN, *Good Conduct Award*, 2nd award, 25 Apr 93.

Williams, C.E., Ph.D., member, *Interagency Coordinating Committee in Hearing, Deafness and Other Communication Disorders*.

Williams, C.E., Ph.D., reviewer of book chapter for *Handbook of Acoustics*.

Wolfe, P.K., *Civilian of the Quarter*, 4th quarter, and letter of commendation.

Wolfe, P.K., *On-the-Spot Award* for Civilian of the Quarter Award.

APPRECIATION AND COMMENDATION

Anderson, A.M., ltr of *appreciation* from CO NAMRL for "exemplary work on the Advanced Technology Demonstration proposal," Nov 93.

Anderson, A.M., ltr of *appreciation* from CO NAMRL for "superior work on the Combined Federal Campaign," 9 Nov 93.

Bergeron, D.A., HM1 USN, ltr of *commendation* from CO NAMRL for superb technical skills and outstanding personal dedication, 10 Feb 93.

Brown, T.D., HM3 USN, ltr of *commendation* from CO NAMRL for support and contribution to OPMAN, Mar 93.

Chapman, W.E., HM2 USN, ltr of *appreciation* from CO NAMRL for outstanding assistance and as an experiment monitor on the SUSOPS research program. 10 Feb 93.

Chapman, W.E., HM2 USN, ltr of *appreciation* from CO NAS Pensacola for work as a "Command Representative" for 1993 Manna Food Bank Drive, 22 Dec 93.

Clark, C.L., ltr of *appreciation* from CO NAMRL for support of NAMI/NAMRL Dining Out, 5 Oct 93.

Collyer, P.D., ltr of *appreciation* from CO NAS Pensacola for support and assistance of the 218th Navy Ball, 6 Dec 93.

Gadolin, R.E., ltr of *appreciation* from CO NAMRL for Ashton Graybiel Lecture and publication, 5 Jan 93.

Gadolin, R.E., ltr of *appreciation* from Code 22 via CO NAMRL for coordination of 1993 Symposium on Spatial Disorientation in Helicopters and Its Operational Consequences, 9 Jun 93.

Gadolin, R.E., ltr of *appreciation* from CO NMRDC for exemplary assistance in supporting the 1993 Commanding Officer's Conference, 21 Oct 93.

Griner, T.A., ltr of *appreciation* from Navy Environmental Health Center for "participation in the Poster Session of the 34th Navy Occupational Health and Preventative Medicine Workshop," 25 Mar 93.

Helton, K.T., ltr of *commendation* from CO NAS Pensacola for 1993 Combined Federal Campaign.

Johnson, A.D., ltr of *appreciation* from CO NAMRL for outstanding member of Morale, Welfare, and Recreation Committee, 10 Feb 93.

Kerr, P.W., Ph.D., ltr of *appreciation* from CO NAMRL for outstanding work on the Helo Scan Project, 5 Oct 93.

Mayer, K.S., ltr of *appreciation* from CO NAMRL for outstanding member of Morale, Welfare, and Recreation Committee, 10 Feb 93.

Marcos, M.D., HMC(AW) USN, ltr of *commendation* from CO NAS Pensacola for 1993 Combined Federal Campaign.

NAMRL Staff: *outstanding PRT Certificates and 96-hour special liberty pass*, 9 Jun 93.

Arenas, F.J., LT MSC USNR
Blower, D. L., LCDR MSC USN
Dolgin, D.L., CDR MSC USN
Flowers, T., HMC(SW) USN
García, J.M., HM1(AW) USN
Gilliard, F.J., DPC USN
Hackett, D."E.", LT MSC USN
Jacobsen, B.D., ET1(SW) USN
Krebs, W.K., LT MSC USNR
Marcos, M.D., HMC(AW) USN

McKee, C.G., ENS USNR
Patee, J.C., CAPT MSC USN
Patton, R.D., ENS USNR
Pokorski, T.L., LCDR MSC USN
Powe, U.A., HM2 USN
Schuman, K.D., ENS USNR
Sergelin, A.Z., ENS USNR
Tate, E.L., HMC USN
Temple, J.A., ENS USNR
Visage, J.W., HM2 USN

NAMRL Staff: *special liberty pass* for improving PRT by one category, 5 Oct 93.

Cohen, W.C., HM3 USN
Dean, R.L., HMC(SW) USN
Hayden, M.D., HM1 USN

NAMRL Staff: *outstanding PRT Certificates and 96-hour special liberty pass*, 5 Oct 93.

Arenas, F.J., LT MSC USNR
Blower, D.L., LCDR MSC USN
Dolgin, D.L., CDR MSC USN
Elias, J.J., ENS USNR
Epps, D., HM2 USN
Ferguson, K.L., ENS USNR
Flowers, T., HMC(AW) USN
García, J.M., HM1(AW) USN
Hackett, D."E.", LT USN
Heyne, G.T., ENS USNR
Holmes, P.M., LCDR MSC USN
Jones, M.T., HM2 USN

Jacobsen, B.D., ET1(SW) USN
Krebs, W.K., LT MSC USNR
Marcos, M.D., HMC(AW) USN
Mittelman, M.H., CDR MSC USN
Patee, J.C., CAPT MSC USN
Pokorski, T.L., LCDR MSC USN
Powe, U.A., HM2 USN
Reddix, M.D., LT MSC USNR
Robinson, G.W., HM3 USN
Street, D.L., LT MSC USNR
Temple, J.A., ENS USNR
Visage, J.W., HM2 USN

NAMRL Staff: *ltr of commendation* from CO NAMRL for support and contributions toward the command meeting its financial and material management goals, Nov 93.

Robinson, G.V., HM3 USN
Visage, J.W., HM2 USN

Cotton, H.E.
Gandy, J.G.
Taber, J.T.

Neisler, H.M., III, Ph.D., *ltr of commendation* from CO NAMRL for professional ability, technical innovativeness, and commitment to excellence, Jun 93.

Neri, D.F., LCDR MSC USN, *ltr of commendation* from CO NAMRL for superior performance, reliability, and dedication to duty, Mar 93.

Olsen, R.G., Ph.D., *ltr of appreciation* from Navy Environmental Health Center for "participation in the Poster Session of the 34th Navy Occupational Health and Preventative Medicine Workshop." 25 Mar 93.

Olsen, R.G., Ph.D., *ltr of appreciation* from PMS-423 (EMPRESS II Project), Naval Sea Systems Command for "participation in the 1993 EMP Human Health Science Review Panel," 25 Mar 93.

Paul, J.B., ltr of *appreciation* from CO NAMI for contribution to NAMI's Change of Command Ceremony, 25 Jun 93

Paul, J.B., ltr of *appreciation* from CO NAMRL for support of NAMI/NAMRL Dining Out, 5 Oct 93.

Prettyman, G.D., ltr of *appreciation* from CO NAMRL for outstanding work on the Helo Scan Project, 5 Oct 93.

Schuman, K.D., ENS USNR, ltr of *commendation* from CO NAMRL for exemplary performance as a systems analyst and computer programmer, 6 Aug 93.

Van Matre, B.J., ltr of *appreciation* from Navy Environmental Health Center, for "participation in the Poster Session of the 34th Navy Occupational Health and Preventative Medicine Workshop," 25 Mar 93.



TRAINING

General Military and Inservice Training

Standard Subject Identification Codes	Immunizations	Financial Management
Career Enhancement/Officer Programs	Pregnancy Awareness	Uniform Health Services
Laboratory Fundamentals	First Aid	Food Sanitation
Service Record Organization	Diet Therapy	Nutrition Education
Family Advocacy Program	Sea Power	Physical Readiness
Drug and Alcohol Program Assistance	Fleet Marine Force	Decedent Affairs
Medical Mobile Augmentation Team	Pharmacy	Security and Correspondence
Patient Administration	Terminal Digits	Preventive Medicine
Navy Medical Department Organization	Health Records	Industrial Safety
Professional Development	Night Vision	Recreational Safety
Sexually Transmitted Diseases	Correspondence	Legal Assistance
Nuclear, Biological, & Chemical Warfare	VA Benefits	Motor Vehicle Safety

All-hands Training

Total Quality Training, 6 Jan 93	Introduction to Total Quality Leadership, 26 Apr 93
Total Quality Training, 10 Feb 93	Disaster Preparedness, 9 Jun 93
Animal Use Training, 23 Feb 93	Total Quality Training, 9 Jun 93
Nutrition, 3 Mar 93	EEO Review for Supervisors, 10-11 Jun 93
HIV, 10 Mar 93	Travel Regulations, 14 Jul 93
Total Quality Training, 10 Mar 93	Total Quality Training, 4 Aug 93
Receipt of Radioactive Material, 10 Mar 93	Chemical Hygiene, 11 Aug 93
HIV/AIDS Education Training, 10 Mar 93	Standards of Conduct, 1 Sep 93
Requisition Management, 26 Mar 93	Prevention of Sexual Harassment, 27 Sep 93
Accounting Procedures, 31 Mar 93	Occupational Safety, 5 Oct 93
ADP Security, 7 Apr 93	Fire Prevention, 5 and 10 Oct 93
Electrical Safety, 7 Apr 93	Prevention of Sexual Harassment, 28 Oct 93
Total Quality Training, 7 Apr 93	Asbestos Training, 5 Nov 93
ADP Security, 7 Apr 93	Total Quality Leadership, 9 Dec 93
Customer-driven Quality, 19 Apr 93	Traffic Safety, 14 Dec 93
Animal Safety Program, 20 Apr 93	Physical Security, 14 Dec 93
Computer Backups, 28 Apr 93	

Individual Training

Arenas, F.J., LT MSC USNR, attended *Quality, Productivity and Competitive Position*, Dallas, TX, 11-14 May 93.

Arenas, F.J., LT MSC USNR, attended *Information Security Orientation Course*, Pensacola, FL, 7-9 Jun 93.

Arenas, F.J., LT MSC USNR, attended *Team Skills and Concepts*, Virginia Beach, VA, 26 Jul-7 Aug 93.

Arenas, F.J., LT MSC USNR, attended *Patient Administration Course*, Bethesda, MD, 25 Oct-19 Nov 93.

Baker, J.C., CAPT MC USN, attended *WordPerfect 5.1 Intermediate*, Pensacola, FL, 6 Jun 93.

Brown, T.D., HM3 USN, attended *Emergency Vehicle Operators*, Naval Hospital Pensacola, FL, 26-30 Apr 93.

Clark, C.L., attended *How to Plan, Coordinate and Produce a Video*, Orlando, FL, 6-9 Jun 93.

Collyer, P.D., attended *Small Computer Conference*, Montgomery, AL, 13-16 Sep 93.

Cotton, H.E., attended *Stress Reduction Workshop for Women*, Pensacola Beach, FL, 16 Feb 93.

Cotton, H.E., attended *Authorized Accounting Activity (AAA) STARS/FL*, Charleston, NC, 12-16 Apr 93.

Cox, J.R., attended *Time Systems Organizer Workshop*, Pensacola, FL, 18 Mar 93.

Dasho, S.A., attended *Essentials of Desktop Publishing with WordPerfect*, Pensacola, FL, 4 Mar 93.

Dasho, S.A., attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Dasho, S.A., attended *Accounting Orientation for Administrative, Secretarial and Clerical Personnel*, Pensacola, FL, 30-31 Aug 93.

Dasho, S.A., attended *Take Charge Assistant*, Pensacola, FL, 28 Aug 93.

Dolgin, D.L., LCDR MSC USN, attended *Navy Zero-based Training and Education Review*, Corpus Christi, TX, 22-25 Feb 93.

Doss, C.L., SPC USA, attended *Non-human Primates*, Washington, DC, 20 Aug 93.

Epps, D., HM2 USN, attended *Relocation Allowance Update on FTR and JRT Volume II Entitlement*, Pensacola, FL, 3-7 Apr 93.

Epps, D., HM2 USN, attended *GSA Interagency Training*, Pensacola, FL, 3-7 May 93.

Epps, D., HM2 USN, attended *Foundations of Leadership*, Pensacola, FL, 10-21 Aug 93.

Flowers, T., HMC(AW) USN, attended *Conference Planning Seminar*, Pensacola, FL, 2 Nov 93.

Gadolin, R.E., attended *Information Mapping*, Pensacola, FL, 22-26 Feb 93.

Gadolin, R.E., attended *Essentials of Desktop Publishing with WordPerfect*, Pensacola, FL, 4 Mar 93.

Gadolin, R.E., attended *Time Systems Organizer Workshop*, Pensacola, FL, 18 Mar 93.

Gadolin, R.E., attended *Mastering Emotions*, Pensacola, FL, 28 Oct 93.

Gadolin, R.E., attended *Conference Planning Seminar*, Pensacola, FL, 2 Nov 93.

Gadolin, R.E., attended *Harvard Graphics 3.0*, Pensacola, FL, 13-14 Dec 93.

Gandy, J.G., attended *Authorized Accounting Activity (AAA) STARS/FL*, Charleston, NC, 12-16 Apr 93.

Gilliard, F.J., DPC USN, attended *Essentials of Desktop Publishing with WordPerfect*, Pensacola, FL, 4 Mar 93.

Ginsberg, J., attended *Essentials of Desktop Publishing with WordPerfect*, Pensacola, FL, 4 Mar 93.

Ginsberg, J., attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Ginsberg, J., attended *Principles of Navy Budget*, Pensacola, FL, 23 Aug 93.



Hackett, D."E," LT MSC USN, attended *Dale Carnegie Employee Development Training*, Pensacola, FL, 1 Apr 93.

Hackett, D."E," LT MSC USN, attended *Authorized Accounting Activity (AAA) STARS/FL*, Charleston, NC, 15-16 Apr 93.

Hackett, D."E," LT MSC USN, attended *information Security Orientation Course*, Pensacola, FL, 7-9 Jun 93.

Hatcher, D.J., attended *AutoCad Fundamentals*, Pensacola, FL, 13-16 Dec 93.

Hayden, M.D., HMI USN, attended *Fork Lift Training*, Pensacola, FL, 26 May 93.

Hecht, S.C., LT MSC USN, attended *Hazardous Materials and Waste Control*, Charleston, SC, 5-14 Jan 93.

Hecht, S.C., LT MSC USN, attended *Laser Safety*, Pensacola, FL, 6 Apr 93.

Hecht, S.C., LT MSC USN, attended *Biomedical Incinerator Operation*, Pensacola, FL 5-6 May 93

Hecht, S.C., LT MSC USN, attended *Ionizing Radiation Safety Refresher*, Pensacola, FL, 10 May 93.

Hecht, S.C., LT MSC USN, attended *Environmental Protection Course #62*, Port Hueneme, CA, 18-21 May 93.

Hecht, S.C., LT MSC USN, attended *Introduction to Disaster Services*, Pensacola, FL, 26 May 93.

Hecht, S.C., LT MSC USN, attended *Mass Care 1*, Pensacola, FL, 26 May 93.

Hecht, S.C., LT MSC USN, attended *Hazardous Materials and Waste Control*, Charleston, SC, 3-4 Jun 93.

Hecht, S.C., LT MSC USN, attended *Hazardous Assessment and Response Management*, Pensacola, FL, 29 Jun 93.

Hecht, S.C., LT MSC USN, attended *Nuclear Medicine, and Radioisotopes Techniques*, Bethesda, MD, 13 Sep-15 Oct 93.

Helton, K.T., attended *Stress Reduction Workshop for Women*, Pensacola Beach, FL, 16 Feb 93.

Helton, K.T., attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Helton, K.T., attended *Introduction to Troubleshooting and Repairing PC's and PS/2s*, Orlando, FL, 20-21 Sep 93.

Holmes, P.M., LCDR MSC USN, attended *Civilian Personnel Procedures*, Pensacola, FL, 25-28 Oct 93.

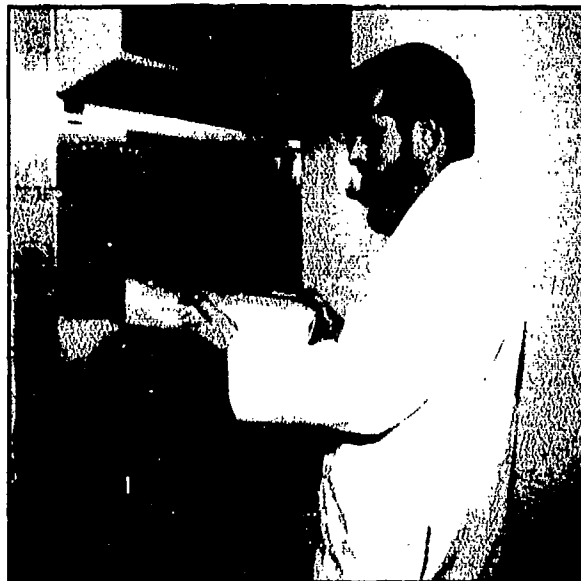
Johnson, A.D., attended *Take Charge Assistant*, Pensacola, FL, 28 Aug 93.

Johnson, A.D., attended *Conference Planning Seminar*, Pensacola, FL, 2 Nov 93.

Johnson, A.D., attended *The Exceptional Assistant*, Pensacola, FL, 5 Nov 93.

Johnson, A.D., attended *Residential Workshop for the Professional Secretary*, Williamsburg, VA, 7-10 Dec 93.

Judson, J.C., attended *Time Systems Organizer Workshop*, Pensacola, FL, 18 Mar 93.



Judson, J.C., attended *Information Security Orientation Course*, Pensacola, FL, 7-9 Jun 93.

Judson, J.C., attended *Mastering Emotions*, Pensacola, FL, 28 Oct 93.

Key, J.S., attended *Time Systems Organizer Workshop*, Pensacola, FL, 18 Mar 93.

Key, J.S., attended *Mastering Emotions*, Pensacola, FL, 28 Oct 93.

Krebs, W.K., LT MSC USNR, attended *How to Develop C Language Applications for the Vision Research Graphics Experiment Workstation*, Durham, NH, 12-13 Jul 93.

Lloyd, J.R., attended *AutoCad Fundamentals for Release 12*, Pensacola, FL, 13-17 Dec 93.

Lockhart, T.M., attended *Proofreading and Editing Skills*, Pensacola, FL, 17 Sep 93.

Lockhart, T.M., attended *How to Be an Outstanding Receptionist*, Pensacola, FL, 18 Nov 93.

Marcos, M.D., HMC(AW) USN, attended *Principles of Navy Budget*, Pensacola, FL, 12 Apr 93.

Marcos, M.D., HMC(AW) USN, attended *Introduction to Disaster Services*, Pensacola, FL, 26 May 93.

Marcos, M.D., HMC(AW) USN, attended *Mass Care 1*, American Red Cross, Pensacola, FL, 26 May 93.

Mateczun, A.J., CAPT MC USN, attended *Commanders Family Advocacy Training*, Pensacola, FL, 23 Feb 93.

Mateczun, A.J., CAPT MC USN, attended *Deming Seminar*, Atlanta, GA, 18-19 Mar 93.

Mateczun, A.J., CAPT MC USN, attended *Management of Productivity and Quality*, Washington, DC, 30-31 Mar 93.

Mateczun, A.J., CAPT MC USN, attended *Equal Employment Opportunity Review for Supervisors*, Pensacola, FL, 11 Jun 93.

Mateczun, A.J., CAPT MC USN, attended *The Last Word Tour with Dr. Juran*, Atlanta, GA, 9 Dec 93.

Mayer, K.S., attended *Essentials of Desktop Publishing with WordPerfect*, Pensacola, FL, 4 Mar 93.

Mayer, K.S., attended *Leadership and Supervisory Skills for Women*, Pensacola, FL, 30 Mar 93.

Mayer, K.S., attended *WordPerfect 5.1 Intermediate*, Pensacola, FL, 19-22 Apr 93.

Mayer, K.S., attended *WordPerfect 5.1 Advanced*, Pensacola, FL, 14-17 Jun 93.

Mayer, K.S., attended *WordPerfect 5.1 Shortcuts*, Pensacola, FL, 1 Oct 93.

Mayer, K.S., attended *Harvard Graphics 3.0*, Pensacola, FL, 17-18 Nov 93.

McKay, D.L., LT MSC USNR, attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Mead, A.M., LT MSC USNR, attended *NAVSUP Contracting Officer's Technical Representative (COTAR)*, Pensacola, FL, 9-21 Oct 93.

Meyer, L.G., attended *Sensormedics Metabolic Analyzer*, Yorba Linda, CA, 5-12 Jun 93.

Mittelman, M.H., CDR MSC USN, attended *Civilian Personnel Procedures*, Pensacola, FL, 13-16 Dec 93.

Molina, E.A., attended *Computer Drafting AutoCad*, Pensacola, FL, 10 Apr 93.

Molina, E.A., attended *Briefing Techniques*, Pensacola, FL, 26 May 93.

Molina, E.A., attended *Fork Lift Training*, Pensacola, FL, 26 May 93.

Molina, E.A., attended *DC Motor Controller Type 570*, Reston VA, 2-5 Nov 93.

Molina, E.A., attended *DC Motor Controller Type 545*, Reston VA, 7-8 Nov 93.

Molina, E.A., attended *Maintenance of Programmable Logic Controller Series 505*, Johnson City TN, 13-17 Dec 93.

Neisler, H.M., III, Ph.D., attended *Coulter Profile Flow Cytometry*, Miami, FL, 2-7 May 93.

Neri, D.F., LCDR MSC USN, attended *Analytic Geometry and Calculus II*, Pensacola, FL, 6 Jan-5 May 93.

Nontasak, T., Ph.D., attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Nontasak, T., Ph.D., attended *WordPerfect for Windows*, Pensacola, FL, 13-17 Sep 93.

Olsen, R.G., Ph.D., attended *AutoCad Fundamentals for Release 12*, Pensacola, FL, 13-17 Dec 93.

Patee, J.C., CAPT MSC USN, attended *Commanders Family Advocacy Training*, Pensacola, FL, 23 Feb 93.

Patee, J.C., CAPT MSC USN, attended *Deming Seminar*, Atlanta, GA, 18-19 Mar 93.

Patee, J.C., CAPT MSC USN, attended *Management of Productivity and Quality*, Washington, DC, 30-31 Mar 93.

Patee, J.C., CAPT MSC USN, attended *WordPerfect 5.1 Intermediate*, Pensacola, FL, 19-22 Apr 93.

Patee, J.C., CAPT MSC USN, attended *Equal Employment Opportunity Review for Supervisors*, Pensacola, FL, 11 Jun 93.

Paul, J.C., attended *Introduction to WordPerfect*, Pensacola, FL, 18 May 93.

Paul, J.C., attended *How to Plan, Coordinate and Produce a Video*, Orlando, FL, 6-9 Jun 93.

Reddix, M.D., LT MSC USNR, attended *Laser Safety*, Pensacola, FL, 6 Apr 93.

Rich, R.A., HMCS(AW) USN, attended *Commanders Family Advocacy*, Pensacola, FL, 23 Feb 93.

Rich, R.A., HMCS(AW) USN, attended *WordPerfect 5.1 Intermediate*, Pensacola, FL, 19-22 Apr 93.

Robinson, G.W., HM3 USN, attended *WordPerfect 5.1 Introduction*, Pensacola, FL, 19-22 Apr 93.

Robinson, G.V., HM3 USN, attended *MS-DOS*, Pensacola, FL, 20 Aug 93.

Robinson, G.V., HM3 USN, attended *Quality Service for Customers*, Pensacola, FL, 20 Aug 93.

Saxton, J.L., attended *Hazardous Materials and Waste Control School*, Oakland, CA, 20-29 Jul 93.

Still, D.L., CDR MSC USN, attended *Analytic Geometry and Calculus II*, Pensacola, FL, 6 Jan-5 May 93.

Street, D.R., LT MSC USNR, completed *Level I Program Managers (LPM)*, Pensacola, FL, 21-24 Jun 93.

Street, D.R., LT MSC USNR, completed *Alcohol and Drug Abuse Managers/Supervisors (ADAMS)*, Pensacola, FL, 24-25 Jun 93.

Taber, J.T., attended *GSA Seminar*, Pensacola, FL, 8 Jan 93.

Taber, J.T., attended *How to Handle Problem Employees*, Pensacola, FL, 26 Aug 93.

Taber, J.T., attended *NAVSUP Contracting Officer's Technical Representative (COTAR)*, Pensacola, FL, 9-21 Oct 93.

Tanner, T.W., HM3 USN, attended *WordPerfect 5.1 Introduction*, Pensacola, FL, 19-22 Apr 93.

Tanner, T.W., HM3 USN, attended *Quality Service for Customers*, Pensacola, FL, 20 Aug 93.

Tate, E.L., HMC USN, attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Tate, E.L., HMC USN, attended *The Art of Communication*, Pensacola, FL, 19 Aug 93.

Temme, L.A., Ph.D., attended *Analytic Geometry and Calculus II*, Pensacola, FL, 6 Jan-5 May 93.

Tracy, M.G., attended *Essentials of Desktop Publishing with WordPerfect*, Pensacola, FL, 4 Mar 93.

Tracy, M.G., attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Van Dyke, P.R., attended *Introduction to Troubleshooting and Repairing PCs and PS/2s*, Orlando, FL, 20-21 Sep 93.

Van Matre, B.J., attended *Dale Carnegie Employee Development Training*, Pensacola, FL, 1 Apr 93.

Van Matre, B.J., attended *Laser Safety*, Pensacola, FL, 6-7 May 93.

Van Matre, B.J., attended *Memory Power*, Pensacola, FL, 22 Jul 93.

Van Matre, B.J., completed *Equal Opportunity in the Navy*, Pensacola, FL, 4 Aug 93.

Van Matre, B.J., attended *Presenting Data in Graphs, Charts and Tables*, Pensacola, FL, 30 Aug-1 Sep 93.

Van Matre, B.J., attended *AutoCad Fundamentals for Release 12*, Pensacola, FL, 13-17 Dec 93.

Visage, J.W., HM2 USN, attended *GSA Seminar*, Pensacola, FL, 8 Jan 93.

Vogel, I.K., attended *Leadership and Supervisory Skills for Women*, Pensacola, FL, 30 Mar 93.

Vogel, I.K., attended *CEAP for Supervisors*, Pensacola, FL, 7 Apr 93.

Vogel, I.K., attended *Small Computer Conference*, Montgomery, AL, 13-16 Sep 93.

White, A.W., attended *Hands-on Windows Programming*, Washington, DC, 14-17 Sep 93.

Wiegmann, D.A., LT MSC USNR, attended *MS-DOS Windows 3.1*, Pensacola, FL, 20 Apr 93.

Williams, C.E., Ph.D., attended *Team Leadership: How to Inspire Commitment, Teamwork and Cooperation*, Pensacola, FL, 14 Sep 93.

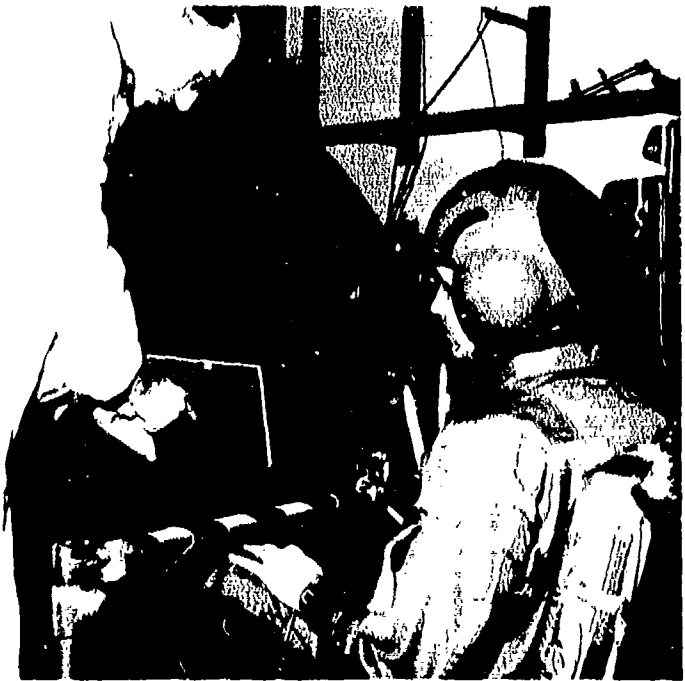
Williams, C.E., Ph.D., attended *Equal Employment Opportunity Review for Supervisors*, Pensacola, FL, 3 Nov 93.

Wolf, J., attended *Conference Planning Seminar*, Pensacola, FL, 2 Nov 93.

Wolfe, P.K., attended *Fork Lift Training*, Pensacola, FL, 26 May 93.



P U B L I C A T I O N S



NAMRL 1993 PUBLICATIONS

- Aguillaume, C., *Is Refugee and War Medicine Becoming a New Specialty?*, NAMRL Special Report 93-4, Naval Aerospace Medical Research Laboratory, Pensacola, FL, November 1993. (AD A275 101)
- Cushman, W.B., "A Parallel Printer Port to Matrix Driver With High Current DAC Output." *Behavior Research Methods, Instruments, & Computers*, Vol. 25, No. 1, pp. 48-52, 1993.
- D'Andrea, J.A., "IEEE Entity Position Statement/The Safety of Electromagnetic Pulse Simulators." In de Lorge, J.O. and Mick, W. (Eds.), *EMP Human Health Effects Science Review Panel Proceedings*, 16-18 March 1993, Theater Nuclear Warfare Program, Washington, DC, and Operational Medicine and Fleet Support, Washington, DC, 1993, pp. 141-148.
- D'Andrea, J.A., Cobb, B.L., and Knepton, J., *Behavioral Performance in Monkeys Exposed to Tempo High-Peak-Power Microwave Pulses at 3 GHz*, NAMRL-1389, Naval Aerospace Medical Research Laboratory, Pensacola, FL, December 1993.
- D'Andrea, J.A., Cobb, B.L., and Knepton, Jr., J.C., "Behavioral Effects of High-peak-power Microwave Pulses: Head Exposure at 1.3 GHz." In A.Y.J. Szeto and R.M. Rangayyan (Eds.), *Proceedings of the 15th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Volume 15*, 28-31 October 1993, San Diego, CA, p. 1466.
- de Lorge, J.O. and Mick, W. (Eds.), *EMP Human Health Effects Science Review Panel Proceedings*, 16-18 March 1993, Theater Nuclear Warfare Program, Washington, DC, and Operational Medicine and Fleet Support, Washington, DC, 1993, 176 pp.
- DeVietti, T.L., D'Andrea, J.A., Hatcher, D.J., and Reddix, M.D., "A Training Procedure for Obtaining Contrast-sensitivity Functions Within a Single Session in Monkeys." *Bulletin of the Psychonomic Society*, Vol. 31, No. 4, pp. 245-248, 1993.
- Forstall, J.R. and Olsen, R.G., "A Simple EMP Intensity Meter From a Photographic Flash Meter." In M. Blank (Ed.), *Electricity and Magnetism in Biology and Medicine*, San Francisco Press, Inc., 1993, pp. 883-884.
- Griner, T.A., Olsen, R.G., and King, J.J., "Conducting Socks Eliminate Ankle SAR in a Full-Size Model Exposed to Near-Field Irradiation at Three Radiofrequencies." In M. Blank (Ed.), *Electricity and Magnetism in Biology and Medicine*, San Francisco Press, Inc., 1993, pp. 566-568.
- Grissett, J.D., *Mathematical Model for Interaction of Canals and Otoliths in Perception of Orientation, Translation, and Rotation*, NAMRL Special Report 93-5, Naval Aerospace Medical Research Laboratory, Pensacola, FL, December 1993.
- Guedry, F.E., "Space Vestibulo-neuroscience in the New Century: Why Proceed in Semidarkness?" *Oto-neuroscience and Space Vestibular-neuroscience in the new Century, ORL*, Vol. 119, No. 5., pp. 167-172, 1993.
- Lloyd, J.R., Goodman, L.R., and Couch, J.A., "Chronic Exposure of Sheepshead Minnows to a 60-Hz Electromagnetic Field." In M. Blank (Ed.), *Electricity and Magnetism in Biology and Medicine*, San Francisco Press, Inc., 1993, pp. 842-844.

Lloyd, J.R., Olsen, R.G., and Van Matre, B.J., "Comparisons of hand warming among two radiofrequency gloves and a direct-current glove." In M. Blank (Ed.), *Electricity and Magnetism in Biology and Medicine*, San Francisco Press, Inc., 1993, pp. 777-778.

McGrath, B.J., *Human Vestibular Response During 3 G_i Centrifuge Stimulation*, NAMRL Monograph 46, Naval Aerospace Medical Research Laboratory, Pensacola, FL, April 1993.

McGrath, B.J., Oman, C.M., Guedry, F.E., and Rupert A.H., *Human Vestibulo-ocular Response During 3 G_i Centrifuge Stimulation*, NAMRL-1388, Naval Aerospace Medical Research Laboratory, Pensacola, FL, December 1993.

Meyer, L.G., Horrigan, Jr., D.J., Neisler, H.M., and Lotz, W.G., "Effects of Three Hydration Beverages on Exercise Performance During 60 Hours of Simulated Desert Exposure." *Advisory Group for Aerospace Research & Development Conference Proceedings 540*, pp. 32-1 to 32-10, 1993.

Neri, D.F. and Shappell, S.A., *Work/Rest Schedules and Performance of S-3 Aviators During Fleet Exercise 1992*, NAMRL-1382, Naval Aerospace Medical Research Laboratory, Pensacola, FL, March 1993. (AD A265 807)

Nontasak, T., Dolgin, D.L., Blower, D.J., Helton, K.T., and Street, Jr., D.R., "A Comparison Between Two Hardware Implementations of a Crew Selection System." *DoD Human Factors Engineering Technical Group*, 30th Meeting, Dayton, OH, 11-14 May 1993, p. 11-4.

Nontasak, T. and Helton, K.T., *A Comparison of Two Hardware Implementations of a Crew Selection System*, NAMRL Special Report 93-3, Naval Aerospace Medical Research Laboratory, Pensacola, FL, October 1993. (AD A274 913)

Olsen, R.G., "Historical Basis of DOD EMP Standards." In de Lorge, J.O. and Mick, W. (Eds.), *EMP Human Health Effects Science Review Panel Proceedings*, 16-18 March 1993, Theater Nuclear Warfare Program, Washington, DC, and Operational Medicine and Fleet Support, Washington, DC, 1993, p. 11.

Olsen, R.G., "NAMRL Dosimetry Research." In de Lorge, J.O. and Mick, W. (Eds.), *EMP Human Health Effects Science Review Panel Proceedings*, 16-18 March 1993, Theater Nuclear Warfare Program, Washington, DC, and Operational Medicine and Fleet Support, Washington, DC, 1993, pp. 70-89.

Olsen, R.G. and Griner, T.A., "Specific Absorption Rate and Radiofrequency Current-to-Ground in Human Models Exposed to Near-Field Irradiation." *Health Physics*, Vol 64, No. 6, pp. 633-637, June 1993.

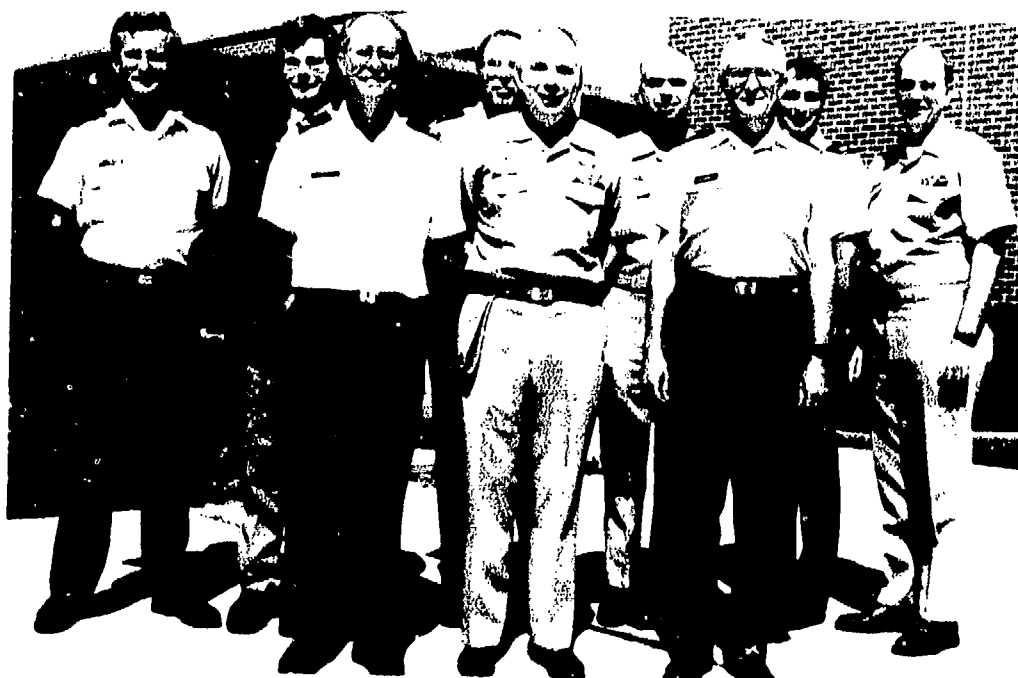
Olsen, R.G., Griner, T.A., and Van Matre, B.J., "Measurements of RF Current and Localized SAR Near a Shipboard RF Heat Sealer." In M. Blank (Ed.), *Electricity and Magnetism in Biology and Medicine*, San Francisco Press, Inc., 1993, pp. 927-929.

Olsen, R.G., Griner, T.A., Van Matre, B.J., and King, J.J., *Measurements of Radiofrequency (RF) Body Potential and Body Currents in Personnel Aboard Two Classes of Navy Ships*, NAMRL-1384, Naval Aerospace Medical Research Laboratory, Pensacola, FL, June 1993. (AD A275 760)

Reddix, M.D., Markovits, A.S., Collyer, P.D., & O'Connell, S.R., *Effects of Bifocal and Progressive-addition Corrective Lenses on Aviator Target Detection Performance*, NAMRL-1390, Naval Aerospace Medical Research Laboratory, Pensacola, FL, December 1993.

- Rupert, A.H. and Gadolin, R.E., *Motion and Spatial Disorientation Systems: Special Research Capabilities*, Naval Aerospace Medical Research Laboratory, Pensacola, FL, April 1993. (AD A265 155)
- Saxton, J.L., Garcia, J.M., Meyer, L.G., and Lotz, W.G., *Bladder Catheterization Technique for Male Rhesus Monkeys*, NAMRL Technical Memorandum 93-1, Naval Aerospace Medical Research Laboratory, Pensacola, FL, June 1993. (AD A275 884)
- Shamma, S.E. and Stanny, R.R., "Models of Cognitive Performance Assessment Tests," *Mathematical Modeling and Scientific Computing*, Vol. 2, pp. 240-245, 1993.
- Shappell, S.A. and Neri, D.F., "Effect of Combat on Aircrew Subjective Readiness During Operation Desert Shield/Storm." *The International Journal of Aviation Psychology*, Vol. 3, No. 3, pp. 231-252, 1993.
- Shappell, S.A. and Neri, D.F., *Work/Rest Schedules and Performance of F/A-18 Aviators During Fleet Exercise 1992*, NAMRL-1383, Naval Aerospace Medical Research Laboratory, Pensacola, FL, March 1993. (AD A265 826)
- Stanny, R.R., *Iterated-bootstrap Confidence Intervals for the Mean*, NAMRL Special Report 93-6, Naval Aerospace Medical Research Laboratory, Pensacola, FL, December 1993.
- Stanny, R.R., *Test Reliability and Experimental Power*, NAMRL Special Report 93-7, Naval Aerospace Medical Research Laboratory, Pensacola, FL, December 1993.
- Stanny, R.R., McCardie, A.H., and Neri, D.F., *Effects of Methamphetamine and Fatigue on Long- and Short-term Memory*, NAMRL-1387, Naval Aerospace Medical Research Laboratory, Pensacola, FL, October 1993. (AD A276 452)
- Stanny, R.R., McCardie, A.H., and Neri, D.F., *Effects of Methamphetamine on Vigilance and Tracking During Extended Wakefulness*, NAMRL-1386, Naval Aerospace Medical Research Laboratory, Pensacola, FL, September 1993. (AD A274 896)
- Street, D.R. and Dolgin, D.L., "Combat Aircrew Selection and Classification." *Air Standardization Coordinating Committee*, Advisory Publication 61/115Q, September 1993, 4 pp.
- Street, D.R., Jr., Dolgin D.L., and Helton, K.T., "Personality Tests in an Enhanced Pilot Selection Model." In R.S. Jensen and D. Neumeister (Eds.), *Proceedings of the 7th International Symposium on Aviation Psychology Vol. 1*, The Ohio State University, Columbus, OH, 26-29 April 1993, pp. 428-438.
- Street, D.R. and Helton, K.T., "The 'Right Stuff': Personality Tests and the Five-factor Model in Landing Craft Air Cushion Crew Training." *Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting*, 11-15 October, Seattle, WA, pp. 920-924, 1993.
- Street, D.R., Helton, K.T., and Nontasak, T., *An Evaluation of Personality Testing and the Five-factor Model in Selection of LCAC Vehicle Crew Members*, NAMRL-1385, Naval Aerospace Medical Research Laboratory, Pensacola, FL, July 1993. (AD A275 869)
- Temme, L.A., *Naval Aviation Vision Standards Research at the Naval Aerospace Medical Research Laboratory: The Long View*, NAMRL Special Report 93-2, Naval Aerospace Medical Research Laboratory, Pensacola, FL, April 1993. (AD A275 885)

Wiegman, D.A., Neri, D.F., Stanny, R.R., Shappell, S.A., McCardie, A.H., and McKay, D.L., *Behavioral Effects of Tyrosine During Sustained Wakefulness*, NAMRL-1392, Naval Aerospace Medical Research Laboratory, Pensacola, FL, December 1993.



OTHER PUBLICATIONS

Helton, K.T. and Street, D.R., *The Five Factor Personality Model in Naval Aviation Selection*, Proceedings of the 64th Annual Scientific Meeting of the Aerospace Medical Association, Toronto, Canada, 22-31 May 93.

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Lawson, B.D., Guedry, F.E., Rupert, A.H., and Anderson, A.M., "Attenuating the Disorientation Effects of Head Movement During Whole-body Rotation Using a Visual Reference." Proceedings of the *Aerospace Medical Panel of AGARD on "Virtual Interfaces: Research and Applications"*, Lisbon, Portugal, 93.

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U.S. Army Safety Center: BG R. Dennis Kerr

VXE-5, China Lake: CAPT Jack Shields

VISITING SCIENTIST PROGRAMS

● OFFICE OF NAVAL RESEARCH (ONR) POSTDOCTORAL FELLOWSHIP PROGRAM

Dr. Ben Lawson (NAMRL Acceleration Division) and Dr. Paul Kerr (NAMRL Sensory Sciences Division) concluded first-year ONR postdoctoral research appointments and accepted second-year appointments.

● U.S. NAVY-ASEE SUMMER FACULTY RESEARCH PROGRAM

Two visiting university faculty held U.S. Navy-ASEE Summer Faculty research appointments in the laboratory's Acceleration Division during the summer.

Dr. Amit Patra, Department of Engineering, University of Puerto Rico, Mayaguez: Dr. Patra's research was summarized in an ASEE abstract entitled "*Computer Simulation of Vestibular Transduction During Simple Centrifuge Runs.*"

Dr. Edward Jarmul, General Engineering Department, Pennsylvania State University, New Kensington: Dr. Jarmul's research was summarized in an ASEE abstract entitled "*Utilization of Vibrotactile Information Channels to Improve Pilot Awareness of Aircraft Attitude.*"

● UNIVERSITY FACULTY PROVIDING SERVICES UNDER INTERGOVERNMENTAL PERSONNEL ACT (IPA) AGREEMENTS

Dr. Manning J. Correia, Director of Research, Department of Human Resources, University of Texas Medical Branch, Galveston, Texas (NAMRL Acceleration Division).

Dr. Joe O. Owasoyo, University of Arkansas at Pine Bluff, Arkansas (Aviation Performance Division).

● SCIENTIST ENGINEER EXCHANGE PROGRAM

Ferdinand M.T.I. Rameckers and LtCol Willem Tielemans of the Royal Netherlands Air Force are assigned to the Acceleration Division for 2 years.



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